

Department of State Health Services
Council Agenda Memo for State Health Services Council
July 9, 2008

Agenda Item Title: Amendments to rules concerning General Provisions and Standards for the Protection Against Radiation from Radioactive Materials

Agenda Number: 3c

Recommended Council Action:

For Discussion Only

For Discussion and Action by the Council

Background: The Radiation Control Program (RCP) is in the Division for Regulatory Services and provides a regulatory program to protect and promote the physical and environmental health of the citizens of Texas. The regulatory program includes licensing, registration, inspection, enforcement, and emergency response functions for the use of radioactive material and radiation machines. The RCP regulates approximately 1,600 licensees and 16,000 registrants. The RCP is entirely fee funded from fees charged for licenses and registrations that it issues. The rules comply with a four-year review of agency rules in Government Code, §2001.039.

Summary:

Section 289.201 provides general provisions for radioactive material such as definitions, inspections, and tests for leakage and/or contamination of sealed sources. Section 289.202 provides standards for protection against radiation from radioactive materials such as dose limits for workers and members of the public and radioactive material security requirements.

The amendment to §289.201 corrects rule references, revises the definition of byproduct material, clarifies the definition of radiation safety officer, and adds definitions for discrete source and waste as required for compatibility with the U.S. Nuclear Regulatory Commission (NRC). Clarification is made in the rule for records of receipt, transfer, and disposal of sources of radiation, and a time frame is added for action to be taken for a radioactive sealed source that has been determined to be leaking.

The expected outcome of the revisions to §289.201 is to provide definitions for terminology used and procedures implemented, relating to radioactive material, that are consistent with the NRC because as an agreement state Texas must maintain rules that are compatible with NRC. In addition, the proposed revisions to §289.201 can reasonably be expected to achieve safe and beneficial practices to ensure continued protection of the public, workers, and the environment from unnecessary exposure to radiation.

The amendment to §289.202 is necessary for compatibility with the NRC. Texas, as an agreement state, must maintain rules that are compatible with NRC rules. These changes include clarification in determining occupational dose limits, and a requirement that portable gauge licensees use a minimum of two independent physical controls to secure gauges when the gauge is not under the control and constant surveillance of the licensee. Clarification is added for waste disposal at approved facilities to be consistent with the new definition of byproduct material being proposed in §289.201 of this title. References to uranium rules are being deleted as a result of Senate Bill 1604, 80th Legislative Session, 2007, which transferred the regulatory authority for licensing and inspection of low-level waste processing and uranium recovery and disposal from the department to the Texas Commission on Environmental Quality. The date for submission to the NRC of the initial inventory for the National Source Tracking System is being changed based on compatibility with the NRC.

The expected outcome of the revisions to §289.202 is for Texas to maintain its status as an agreement state by maintaining rules that are compatible with NRC rules. Specifically, the requirement for portable gauge licensees to use a minimum of two independent physical controls to secure gauges can reasonably be expected to provide additional security of radioactive material and to decrease the chances of it falling into the hands of unlicensed and potentially terrorist individuals.

Measurement of outcomes will be accomplished through existing mechanisms for regulatory programs. The Division of Regulatory Services routinely monitors complaints received and resolved, numbers of new and renewed licenses, number of disciplinary actions taken and monitoring of violation trends.

Summary of Input from Stakeholder Groups: The draft rules were made available on the Radiation Control website (www.dshs.state.tx.us/radiation/draft.shtm). Radiation Control stakeholders and staff were provided notification of the amendments of the rules and were allowed time for review and comment. The only comment of note from the stakeholders was that they were already required to follow these rules because of federal requirements. The proposed rules were reviewed by the Texas Radiation Advisory Board (TRAB) at their June 2008, meeting in Austin, Texas. TRAB recommended that the §289.201 and §289.202 be forwarded to the State Health Services Council for consideration as proposed rules.

Proposed Motion: Motion to recommend HHSC approval for publication of rules contained in agenda item #3c.

Approved by Assistant Commissioner/Director:	Kathryn C. Perkins, R.N., M.B.A.	Date:	6/2/08
Presenter:	Cindy Cardwell, Manager, Program: Policy/Standards/Quality Assurance Radiation Group	Phone No.:	834-6770
Unit, Environmental and Consumer Safety Section			
Approved by CCEA:	Rosamaria Murillo	Date:	May 28, 2008

TITLE 25. HEALTH SERVICES

Part 1. DEPARTMENT OF STATE HEALTH SERVICES

Chapter 289. Radiation Control

Subchapter D. General

Amendments §289.201 and 289.202

Proposed Preamble

The Executive Commissioner of the Health and Human Services Commission on behalf of the Department of State Health Services (department) proposes an amendment to §289.201 concerning general provisions for radioactive material, and an amendment to §289.202 concerning standards for protection against radiation from radioactive materials.

BACKGROUND AND PURPOSE

The amendment to §289.201 corrects references, revises the definition of byproduct material, clarifies the definition of radiation safety officer, and adds definitions for discrete source and waste as required for compatibility with the U.S. Nuclear Regulatory Commission (NRC). Clarification is made in the rule for records of receipt, transfer, and disposal of sources of radiation, and a timeframe is added for action to be taken for a radioactive sealed source that has been determined to be leaking. The address included for communications, reports, and applications has been updated.

The amendment to §289.202 is necessary for compatibility with the NRC. Texas, as an agreement state, must maintain rules that are compatible with NRC rules. These changes include clarification for the use of deep-dose equivalent and effective dose equivalent in determining occupational dose limits, and a requirement that portable gauge licensees use a minimum of two independent physical controls to secure gauges whenever they are not under the control and constant surveillance of the licensee. Clarification is added for waste disposal at approved facilities to be consistent with the new definition of byproduct material being proposed in §289.201 of this title. References to uranium rules are being deleted as a result of Senate Bill (SB) 1604, 80th Legislature, 2007, amending Health and Safety Code, §401.011, which transferred the regulatory authority for licensing and inspection of low-level waste processing and uranium recovery and disposal from the department to the Texas Commission on Environmental Quality (TCEQ). The elements, nitrogen and oxygen, are added to the list of elements and the table of values for annual intake for reasons of NRC compatibility. The date for submission to the NRC of the initial inventory for the National Source Tracking System is being changed based on compatibility with the NRC.

Government Code, §2001.039, requires that each state agency review and consider for readoption each rule adopted by that agency pursuant to the Government Code, Chapter 2001 (Administrative Procedure Act). Sections 289.201 and 289.202 have been reviewed and the department has determined that the reasons for adopting these sections continue to exist because rules on these subjects are needed.

SECTION-BY-SECTION SUMMARY

The reference to the table listed in §289.201(b)(9)(A) has been revised. The definition of byproduct material in §289.201(b)(15) has been revised in order to maintain compatibility with the NRC. The definition of discrete source in §289.201(b)(28) is added in order to maintain compatibility with the NRC. Section 289.201(b)(71) corrects the reference to the Texas Medical Board. Section 289.201(b)(80) has information added to the definition of radiation safety officer in order to clarify citations specific to training and responsibilities for radiation safety officers. A typographical correction is made in §289.201(b)(99). The definition of total effective dose equivalent in §289.201(b)(109) has been changed in order to maintain compatibility with the NRC. Rule reference corrections have been made in §289.201(b)(112). The definition of waste has been added in §289.201(b)(118) in order to maintain compatibility with the NRC. In §289.201(d)(1)(A)(iii) and (iv), references to “person” have been changed to “licensee” for clarification purposes. Section 289.201(g)(6) adds clarification that a leaking sealed source must be repaired or transferred within two years, and equipment associated with a leaking source must also be checked for contamination. Both clarifications are made in order to maintain compatibility with the NRC. Section 289.201(k)(1) corrects the agency address.

Section 289.202(f)(3) clarifies that the deep-dose equivalent must be used in place of the effective dose equivalent if external exposure is determined by measurement with an external personal monitoring device, in order to maintain compatibility with the NRC. Section 289.202(p)(2)(E) clarifies details associated with the determination of the accuracy of instruments and equipment used for quantitative radiation measurements. Section 289.202(y)(3) adds security requirements for portable gauges in order to maintain compatibility with the NRC.

References to rules regarding uranium and licensing of radioactive waste processing and storage facilities are removed in §289.202(ff)(1)(A), §289.202(ccc)(2), §289.202(ddd)(1)(A), and §289.202(fff)(4) as a result of SB 1604, 80th Legislature, 2007, amending Health and Safety Code, §401.011, which transferred the regulatory authority for licensing and inspection of low-level waste processing and uranium recovery and disposal from the department to the TCEQ. Waste shipping requirements are added in §289.202(ff)(4), (5) and (6), in order to maintain compatibility with the NRC. References are corrected in §289.202(j)(4), §289.202(ll)(4), §289.202(eee)(2)(A), and §289.202(fff)(9). The elements, nitrogen and oxygen, are added to §289.202(ggg)(2)(E) in order to maintain compatibility with the NRC. A date correction is made in §289.202(hhh)(1)(H) in order to maintain compatibility with the NRC.

FISCAL NOTE

Susan E. Tennyson, Section Director, Environmental and Consumer Safety Section, has determined that for each year of the first five-year period that these sections are in effect, there will be no fiscal implications to the state or local government as a result of enforcing and administering the sections as proposed.

SMALL AND MICRO-BUSINESS IMPACT ANALYSIS

Ms. Tennyson has also determined that there could not be an adverse economic effect on small businesses or micro-businesses required to comply with §289.201 as proposed. This was

determined by interpretation of the rules that small businesses and micro-businesses will not be required to alter their business practices in order to comply with the sections. There are no anticipated economic costs to persons who are required to comply with §289.201 as proposed. Regarding §289.202, there will be anticipated economic costs to persons required to comply with this proposed section, including small businesses. The only small businesses impacted by the amendment are those that are licensed to possess portable gauges and must leave them without the licensee's control and constant surveillance. A maximum of 234 licensees out of a total of approximately 1,600 are small businesses that could be affected financially from the amendment of §289.202. Of these 234 licensees, approximately over half are micro-businesses. The rule is not prescriptive and, therefore, each licensee has choices on how to meet the requirements of the rule. These choices range in cost from using simple chains and locks for a total of approximately \$40 per gauge to the purchase of a very large double locking tool box at a cost of approximately \$800 per gauge. Additionally the licensee can choose to employ a second person to maintain constant surveillance of the gauge at an approximate cost of \$25 per hour rate. The number of hours that the additional employee would be required to maintain constant surveillance of the gauge would vary depending on the circumstances of the assigned job and the required use of the portable gauge. There is no anticipated negative impact on local employment from either proposed rule.

REGULATORY FLEXIBILITY ANALYSIS

Prior to the development of the amendment of §289.202, ideas were reviewed to determine if there were alternative ways to ensure the security of the radioactive sources housed in portable gauges. Texas as an agreement state, must maintain rules that are compatible with NRC rules. Because this requirement is an item of compatibility with the NRC, alternatives were limited. The compatibility requirement of this rule provides that Texas may be the same as or more restrictive than the federal government, but not less restrictive. Based on this, the department has determined that the rule would have to be required of all portable gauge licensees including small and micro-businesses. The rule is flexible in that it is not prescriptive, and each licensee is able to determine the method of security that best suits their operations.

PUBLIC BENEFIT

Ms. Tennyson has also determined that for each year of the first five years the sections are in effect, the public will benefit from adoption of the sections. The public benefit anticipated as the result of enforcing or administering §289.201 and §289.202 is to ensure the security of radioactive material, and to prevent it from falling into the hands of unlicensed and potentially terrorist individuals.

REGULATORY ANALYSIS

The department has determined that this proposal is not a "major environmental rule" as defined by Government Code, §2001.0225. "Major environmental rule" is defined to mean a rule the specific intent of which is to protect the environment or reduce risk to human health from environmental exposure and that may adversely affect, in a material way, the economy, a sector

of the economy, productivity, competition, jobs, the environment or the public health and safety of a state or a sector of the state.

TAKINGS IMPACT ASSESSMENT

The department has determined that the proposed amendments do not restrict or limit an owner's right to his or her property that would otherwise exist in the absence of government action and, therefore, do not constitute a taking under Government Code, §2007.043.

PUBLIC COMMENT

Comments on the proposal may be submitted to Cindy Cardwell, Radiation Group, Policy/Standards/Quality Assurance Unit, Environmental and Consumer Safety Section, Division for Regulatory Services, Department of State Health Services, 1100 West 49th Street, MC 1987, P.O. Box 149347, Austin, TX 78717-9347, (512) 834-6770, extension 2239, or by email to Cindy.Cardwell@dshs.state.tx.us. Comments will be accepted for 30 days following publication of the proposal in the *Texas Register*.

PUBLIC HEARING

A public hearing to receive comments on the proposal will be scheduled after publication in the *Texas Register*, and will be held at the Department of State Health Services, Exchange Building, 8407 Wall Street, Austin, Texas 78754. The meeting date will be posted on the Radiation Group website (www.dshs.state.tx.us/radiation). Please contact Cindy Cardwell at (512) 834-6770, extension 2239, or Cindy.Cardwell@dshs.state.tx.us if you have questions.

LEGAL CERTIFICATION

The Department of State Health Services General Counsel, Lisa Hernandez, certifies that the proposed rules have been reviewed by legal counsel and found to be within the state agencies' authority to adopt.

STATUTORY AUTHORITY

The proposed amendments are authorized by Health and Safety Code, §401.051, which provides the Executive Commissioner of the Health and Human Services Commission with authority to adopt rules and guidelines relating to the control of radiation; and Government Code, §531.0055, and Health and Safety Code, §1001.075, which authorize the Executive Commissioner of the Health and Human Services Commission to adopt rules and policies for the operation and provision of health and human services by the department and for the administration of Health and Safety Code, Chapter 1001. The review of the rules implements Government Code, §2001.039.

The proposed amendments affect the Health and Safety Code, Chapters 401 and 1001; and Government Code, Chapter 531.

Legend: (Proposed Amendments)

Single-Underline = Proposed new language

[Bold Print and Brackets] = Current language proposed for deletion

Regular Print = Current language

(No change.) = No changes are being considered for designated subdivisions

§289.201. General Provisions for Radioactive Material.

(a) (No change.)

(b) Definitions. The following words and terms when used in this chapter shall have the following meanings, unless the context clearly indicates otherwise.

(1) - (5) (No change.)

(6) Agency--The Department of State Health Services [**Texas Department of Health**].

(7) - (8) (No change.)

(9) Airborne radioactivity area--A room, enclosure, or area in which airborne radioactive materials exist in concentrations:

(A) in excess of the derived air concentrations (DACs) specified in Table I, Column 3 [Column 1] of §289.202(ggg)(2)(F) of this title (relating to Standards for Protection Against Radiation from Radioactive Material); or

(B) (No change.)

(10) - (14) (No change.)

(15) Byproduct material--Byproduct material is defined as:

(A) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material; **[and]**

(B) the tailings or wastes produced by or resulting from the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute “byproduct material” within this definition;

(C) any discrete source of radium-226 that is produced, extracted, or converted after extraction, for use for a commercial, medical, or research activity;

(D) any material that has been made radioactive by use of a particle accelerator; and is produced, extracted, or converted for use for a commercial, medical, or research activity; and

(E) any discrete source of naturally occurring radioactive material, other than source material, that is extracted or converted after extraction for use in a commercial, medical, or research activity and that the United States NRC, in consultation with the Administrator of the United States Environmental Protection Agency (EPA), the United States Secretary of Energy, the United States Secretary of Homeland Security, and the head of any other appropriate Federal agency, determines would pose a threat similar to the threat posed by a discrete source of radium-226 to the public health and safety or the common defense and security.

(16) - (27) (No change.)

(28) Discrete source--A radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical, or research activities.

(29) [(28)] Distinguishable from background--The detectable concentration of a radionuclide is statistically different from the background concentration of that radionuclide in the vicinity of the site, or, in the case of structures or equipment, in similar materials using adequate measurement technology, survey, and statistical techniques.

(30) [(29)] Distribution--The physical conveyance and authorized transfer of commodities from producers to consumers and any intermediate persons involved in that conveyance.

(31) [(30)] Dose--A generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, total organ dose equivalent, or total effective dose equivalent. For purposes of this chapter, "radiation dose" is an equivalent term.

(32) [(31)] Dose equivalent (H_T)--The product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the sievert (Sv) and rem.

(33) [(32)] Dose limits--The permissible upper bounds of radiation doses established in accordance with this chapter. For purposes of this chapter, "limits" is an equivalent term.

(34) [(33)] Effective dose equivalent (H_E)--The sum of the products of the dose equivalent to each organ or tissue (H_T) [(H_T)] and the weighting factor (w_T) applicable to each of the body organs or tissues that are irradiated ($H_E = \sum w_T H_T$) [$(H_E = \sigma w_T H_T)$].

(35) [(34)] Embryo/fetus--The developing human organism from conception until the time of birth.

(36) [(35)] Entrance or access point--Any opening through which an individual or extremity of an individual could gain access to radiation areas or to licensed sources of radiation. This includes portals of sufficient size to permit human access, irrespective of their intended use.

(37) [(36)] Exposure--The quotient of dQ by dm where "dQ" is the absolute value of the total charge of the ions of one sign produced in air when all the electrons (negatrons and positrons) liberated by photons in a volume element of air having mass "dm" are completely stopped in air. The SI unit of exposure is the coulomb per kilogram (C/kg). The roentgen is the special unit of exposure. For purposes of this chapter, this term is used as a noun.

(38) [(37)] Exposure rate--The exposure per unit of time.

(39) [(38)] External dose--That portion of the dose equivalent received from any source of radiation outside the body.

(40) [(39)] Extremity--Hand, elbow, arm below the elbow, foot, knee, and leg below the knee. The arm above the elbow and the leg above the knee are considered part of the whole body.

(41) [(40)] Generally applicable environmental radiation standards--Standards issued by the United States Environmental Protection Agency (EPA) under the authority of the Atomic Energy [**energy**] Act of 1954, as amended, that impose limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material.

(42) [(41)] Gray (Gy)--The SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule per kilogram (J/kg) or 100 rad.

(43) [(42)] High radiation area--An area, accessible to individuals, in which radiation levels from sources of radiation external to the body could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 millisievert (mSv)) in one hour at 30 cm from any source of radiation or from any surface that the radiation penetrates.

(44) [(43)] Human use--The internal or external administration of radiation or radioactive material to human beings for healing arts purposes or research and/or development specifically authorized by the agency.

(45) [(44)] Individual--Any human being.

(46) [(45)] Individual monitoring--The assessment of:

(A) dose equivalent to an individual by the use of individual monitoring devices; or

(B) committed effective dose equivalent to an individual by bioassay or by determination of the time-weighted air concentrations to which an individual has been exposed, that is, DAC-hours. (See the definition for DAC-hours in §289.202(c) of this title); or

(C) dose equivalent to an individual by the use of survey data.

(47) [(46)] Individual monitoring devices--Devices designed to be worn by a single individual for the assessment of dose equivalent. For purposes of this chapter, "personnel dosimeter" and "dosimeter" are equivalent terms. Examples of individual monitoring devices include, but are not limited to, film badges, thermoluminescence dosimeters (TLDs), optically stimulated luminescence dosimeters (OSLs), pocket ionization chambers (pocket dosimeters), electronic personal dosimeters, and personal air sampling devices.

(48) [(47)] Inspection--An official examination and/or observation including, but not limited to, records, tests, surveys, and monitoring to determine compliance with the Act and rules, orders, requirements, and conditions of the agency.

(49) [(48)] Internal dose--That portion of the dose equivalent received from radioactive material taken into the body.

(50) [(49)] Ionizing radiation--Any electromagnetic or particulate radiation capable of producing ions, directly or indirectly, in its passage through matter. Ionizing radiation includes gamma rays and x rays, alpha and beta particles, high-speed electrons, neutrons, and other nuclear particles.

(51) [(50)] Land disposal facility--The land, buildings, and equipment that are intended to be used for the disposal of low-level radioactive waste (LLRW) into the subsurface of the land.

(52) [(51)] Lens dose equivalent--The external dose equivalent to the lens of the eye at a tissue depth of 0.3 cm (300 mg/cm²).

(53) [(52)] License--A form of permission given by the agency to an applicant who has met the requirements for licensing set out in the Act and this chapter.

(54) [(53)] Licensed material--Radioactive material received, possessed, used, or transferred under a general or specific license issued by the agency.

(55) [(54)] Licensee--Any person who is licensed by the agency in accordance with the Act and this chapter.

(56) [(55)] Licensing state--Any state with rules equivalent to the Suggested State Regulations for Control of Radiation relating to, and having an effective program for, the regulatory control of naturally occurring or accelerator-produced radioactive material (NARM) and has been designated as such by the Conference of Radiation Control Program Directors, Inc.

For the purposes of evaluation and/or distribution of sealed sources, this includes Licensing State Status: Product Review Only.

(57) [(56)] Lost or missing radioactive material--Radioactive material whose location is unknown. This definition includes licensed material that has been shipped but has not reached its planned destination and whose location cannot be readily traced in the transportation system.

(58) [(57)] Low-level radioactive waste (LLRW)--Radioactive material that meets the following criteria:

(A) LLRW is radioactive material that is:

(i) discarded or unwanted and is not exempt by rule adopted under the Texas Radiation Control Act (Act), Health and Safety Code, §401.106;

(ii) waste, as that term is defined in Title 10, CFR, §61.2 [**Part 61.2**]; and

(iii) subject to:

(I) concentration limits established in Title 10, CFR, §61.55 [**Part 61.55**], or compatible rules adopted by the agency or the Texas Commission on Environmental Quality (TCEQ), as applicable; and

(II) disposal criteria established in Title 10, CFR, or established by the agency or TCEQ, as applicable.

(B) LLRW does not include:

(i) high-level radioactive waste as defined by Title 10, CFR, §60.2 [**Part 60.2**];

(ii) spent nuclear fuel as defined by Title 10, CFR, §72.3 [**Part 72.3**];

(iii) byproduct material defined in the Act, Health and Safety Code, §401.003(3)(B);

(iv) naturally occurring radioactive material (NORM) waste that is not oil and gas NORM waste;

(v) oil and gas NORM waste; or

(vi) transuranics greater than 100 nanocuries per gram.

(59) [(58)] Manufacture--To fabricate or mechanically produce.

(60) [(59)] Member of the public--Any individual, except when that individual is receiving an occupational dose.

(61) [(60)] Minor--An individual less than 18 years of age.

(62) [(61)] Monitoring--The measurement of radiation, radioactive material concentrations, surface area activities, or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses. For purposes of this chapter, "radiation monitoring" and "radiation protection monitoring" are equivalent terms.

(63) [(62)] NARM--Any naturally occurring or accelerator-produced radioactive material except source material or special nuclear material.

(64) [(63)] Natural radioactivity--Radioactivity of naturally occurring nuclides whose location and chemical and physical form have not been altered by man.

(65) [(64)] NRC--The United States Nuclear Regulatory Commission [(NRC)] or its duly authorized representatives.

(66) [(65)] Occupational dose--The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to sources of radiation from licensed/registered and unlicensed/unregistered sources of radiation, whether in the possession of the licensee/registrant or other person. Occupational dose does not include dose received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with this chapter, from voluntary participation in medical research programs, or as a member of the public.

(67) [(66)] Particle accelerator--Any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and designed to discharge the resultant particulate or other associated radiation at energies usually in excess of 1 MeV.

(68) [(67)] Person--Any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, agency, local government, any other state or political subdivision or agency thereof, or any other legal entity, and any legal successor, representative, agent, or agency of the foregoing, other than NRC, and other than federal government agencies licensed or exempted by NRC.

(69) [(68)] Personnel monitoring equipment (See definition for individual monitoring devices.)

(70) [(69)] Pharmacist--An individual licensed by the Texas State Board of Pharmacy to compound and dispense drugs, prescriptions, and poisons.

(71) [(70)] Physician--An individual licensed by the Texas Medical Board [Texas State Board of Medical Examiners].

(72) [(71)] Principal activities--Activities authorized by the license that are essential to achieving the purpose(s) for which the license was issued or amended. Storage during which no licensed material is accessed for use or disposal and activities incidental to decontamination or decommissioning are not principal activities.

(73) [(72)] Public dose--The dose received by a member of the public from exposure to sources of radiation released by a licensee, or to any other source of radiation under the control of a licensee/registrant. It does not include occupational dose or doses received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with this chapter, or from voluntary participation in medical research programs.

(74) [(73)] Quality factor (Q)--The modifying factor listed in subsection (n)(1) and (2) of this section that is used to derive dose equivalent from absorbed dose.

(75) [(74)] Quarter (calendar quarter)--A period of time equal to one-fourth of the year observed by the licensee, approximately 13 consecutive weeks, providing that the beginning of the first quarter in a year coincides with the starting date of the year and that no day is omitted or duplicated in consecutive quarters.

(76) [(75)] Rad--The special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs per gram (erg/g) or 0.01 J/kg (0.01 gray).

(77) [(76)] Radiation--One or more of the following:

(A) gamma and x rays; alpha and beta particles and other atomic or nuclear particles or rays;

(B) emission of radiation from any electronic device to such energy density levels as to reasonably cause bodily harm; or

(C) sonic, ultrasonic, or infrasonic waves from any electronic device or resulting from the operation of an electronic circuit in an electronic device in the energy range to reasonably cause detectable bodily harm.

(78) [(77)] Radiation area--Any area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 rem (0.05 mSv) in one hour at 30 cm from the source of radiation or from any surface that the radiation penetrates.

(79) [(78)] Radiation machine--Any device capable of producing ionizing radiation except those devices with radioactive material as the only source of radiation.

(80) [(79)] Radiation safety officer (RSO)--An individual who has a knowledge of and the authority and responsibility to apply appropriate radiation protection rules, standards, and practices, who must be specifically authorized on a radioactive material license, and who is the primary contact with the agency. Specific training and responsibilities for an RSO are listed in §289.252 of this title (relating to Licensing of Radioactive Material), §289.253 of this title (relating to Radiation Safety Requirements for Well Logging Service Operations and Tracer Studies), §289.255 of this title (relating to Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography), and §289.256 of this title (relating to Medical and Veterinary Use of Radioactive Material).

(81) [(80)] Radioactive material--Any material (solid, liquid, or gas) that emits radiation spontaneously.

(82) [(81)] Radioactive waste--As used in §289.254 of this title (relating to Licensing of Radioactive Waste Processing and Storage Facilities), this term is equivalent to LLRW.

(83) [(82)] Radioactivity--The disintegration of unstable atomic nuclei with the emission of radiation.

(84) [(83)] Radiobioassay (See definition for bioassay.)

(85) [(84)] Registrant--Any person issued a certificate of registration by the agency in accordance with the Act and this chapter.

(86) [(85)] Regulation (See definition for rule.)

(87) [(86)] Regulations of the United States Department of Transportation (DOT)--The requirements in Title 49, CFR, Parts 100-189.

(88) [(87)] Rem--The special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (1 rem = 0.01 sievert (Sv)).

(89) [(88)] Research and development--Research and development is defined as:

(A) theoretical analysis, exploration, or experimentation; or

(B) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes.

(90) [(89)] Residual radioactivity--The radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from all licensed and unlicensed sources used by the licensee, but excludes

background radiation. It also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of Title 30, Texas Administrative Code, §336.334.

(91) [(90)] Restricted area--An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to sources of radiation. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

(92) [(91)] Roentgen (R)--The special unit of exposure. One roentgen (R) equals $2.58 \times 10^{-4} \text{ C/kg}$ of air. (See definition for exposure.)

(93) [(92)] Rule (as defined in the Government Code, Chapters 2001 and 2002, as amended)--Any agency statement of general applicability that implements, interprets, or prescribes law or policy, or describes the procedure or practice requirements of an agency. The term includes the amendment or repeal of a prior section but does not include statements concerning only the internal management or organization of any agency and not affecting private rights or procedures. The word "rule" was formerly referred to as "regulation."

(94) [(93)] Sealed source--Radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal of the radioactive material under the most severe conditions that are likely to be encountered in normal use and handling.

(95) [(94)] Shallow dose equivalent (H_s) (that applies to the external exposure of the skin or the skin of an extremity)--The dose equivalent at a tissue depth of 0.007 cm (7 mg/cm²) averaged over an area of 1 square centimeter (cm²).

(96) [(95)] SI--The abbreviation for the International System of Units.

(97) [(96)] Sievert--The SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sievert is equal to the absorbed dose in gray multiplied by the quality factor (1 Sv [Sv] = 100 rem).

(98) [(97)] Site boundary--That line beyond which the land or property is not owned, leased, or otherwise controlled by the licensee.

(99) [(98)] Source material--Source material is defined as:

(A) uranium or thorium, or any combination thereof, in any physical or chemical form; or

(B) ores that contain by weight [**right**] 0.05% or more of uranium, thorium, or any combination thereof; and

(C) does not include special nuclear material.

(100) [(99)] Source of radiation--Any radioactive material, or any device or equipment emitting or capable of producing radiation.

(101) [(100)] Special form radioactive material--Radioactive material that satisfies the following conditions.

(A) It is either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule;

(B) The piece or capsule has at least one dimension not less than 5 millimeters (mm) (0.2 inch); and

(C) It satisfies the requirements specified by NRC. A special form encapsulation designed in accordance with NRC requirements in effect on June 30, 1983, and constructed prior to July 1, 1985, may continue to be used. A special form encapsulation designed in accordance with NRC requirements in effect on March 31, 1996, and constructed prior to April 1, 1998, may continue to be used. A special form encapsulation either designed or constructed after April 1, 1998, must meet the requirements of this definition applicable at the time of its design or construction.

(102) [(101)] Special nuclear material--Special nuclear material is defined as:

(A) plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that NRC, in accordance with the provisions of the Atomic Energy Act of 1954, §51 as amended, determines to be special nuclear material, but does not include source material; or

(B) any material artificially enriched by any of the foregoing, but does not include source material.

(103) [(102)] Special nuclear material in quantities not sufficient to form a critical mass--Uranium enriched in the isotope 235 in quantities not exceeding 350 grams (g) of contained uranium-235; uranium-233 in quantities not exceeding 200 g; plutonium in quantities not exceeding 200 g; or any combination of them in accordance with the following formula.

(A) For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of such ratios for all of the kinds of special nuclear material in combination shall not exceed "1" (i.e., unity).

(B) For example, the following quantities in combination would not exceed the limitation and are within the formula:

Figure: 25 TAC §289.201(b)(103) [Figure: 25 TAC §289.201(b)(102)]

(104) [(103)] Special units--The conventional units historically used by licensees, for example, curie (activity), rad (absorbed dose), and rem (dose equivalent).

(105) [(104)] Survey--An evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, and/or presence of sources of radiation. When appropriate, such survey includes, but is not limited to, tests, physical examination of location of materials and equipment, measurements of levels of radiation or concentration of radioactive material present, and evaluation of administrative and/or engineered controls.

(106) [(105)] Termination--A release by the agency of the obligations and authorizations of the licensee under the terms of the license. It does not relieve a person of duties and responsibilities imposed by law.

(107) [(106)] Test--A method of determining the characteristics or condition of sources of radiation or components thereof.

(108) [(107)] Texas Regulations for Control of Radiation (TRCR)--All sections of Title 25 Texas Administrative Code (TAC), Chapter 289.

(109) [(108)] Total effective dose equivalent (TEDE)--The sum of the effective dose [deep dose] equivalent for external exposures and the committed effective dose equivalent for internal exposures.

(110) [(109)] Total organ dose equivalent (TODE)--The sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose as described in §289.202(rr)(1)(F) of this title.

(111) [(110)] Transport index--The dimensionless number (rounded up to the next tenth) placed on the label of a package, to designate the degree of control to be exercised by the carrier during transportation. The transport index is determined as follows:

(A) For non-fissile material packages, the number determined by multiplying the maximum radiation level in millisievert per hour (mSv/hr) at 1 meter (m) (3.3 feet) from the external surface of the package by 100 (equivalent to the maximum radiation level in millirem per hour (mrem/hr) at 1 m (3.3 feet); or

(B) For fissile material packages, the number determined by multiplying the maximum radiation level in mSv/hr at 1 m (3.3 feet) from the external surface of the package by 100 (equivalent to the maximum radiation level in mrem/hr at 1 m (3.3 feet), or, for criticality control purposes, the number obtained as described in 10 CFR 71.59, whichever is larger.

(112) [(111)] Type A quantity--A quantity of radioactive material, the aggregate radioactivity of which does not exceed A₁ for special form radioactive material or A₂ for normal form radioactive material, where A₁ and A₂ are given in §289.257(ff) [§289.257(s)(2)] of this

title (relating to Packaging and Transportation of Radioactive Material) or may be determined by procedures described in §289.257 (ff) [**§289.257(s)(1)-(4)**] of this title.

(113)[(112)] Type B quantity--A quantity of radioactive material greater than a type A quantity.

(114) [(113)] Unrefined and unprocessed ore--Ore in its natural form prior to any processing, such as grinding, roasting, beneficiating, or refining.

(115) [(114)] Unrestricted area (uncontrolled area)--An area, or access to, which is neither limited nor controlled by the licensee. For purposes of this chapter, "uncontrolled area" is an equivalent term.

(116) [(115)] Very high radiation area--An area, accessible to individuals, in which radiation levels from sources of radiation external to the body could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in one hour at 1 meter (m) from a source of radiation or from any surface that the radiation penetrates. At very high doses received at high dose rates, units of absorbed dose, gray and rad, are appropriate, rather than units of dose equivalent, Sv and rem.

(117) [(116)] Veterinarian--An individual licensed by the Texas State Board of Veterinary Medical Examiners.

(118) Waste--Low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level radioactive waste means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in paragraph (15)(B), (C), (D) and (E) of this subsection.

(119) [(117)] Week--Seven consecutive days starting on Sunday.

(120) [(118)] Whole body--For purposes of external exposure, head, trunk including male gonads, arms above the elbow, or legs above the knee.

(121) [(119)] Worker--An individual engaged in work under a license or certificate of registration issued by the agency and controlled by a licensee or registrant, but does not include the licensee or registrant.

(122) [(120)] Working level (WL) [**W_L**]--Any combination of short-lived radon daughters in 1 liter of air that will result in the ultimate emission of 1.3×10^5 million electron volts (MeV) of potential alpha particle energy. The short-lived radon daughters are -- for radon-222: polonium-218, lead-214, bismuth-214, and polonium-214; and for radon-220: polonium-216, lead-212, bismuth-212, and polonium-212.

(123) [(121)] Working level month (WLM)--An exposure to one working level for 170 hours -- 2,000 working hours per year divided by 12 months per year is approximately equal to 170 hours per month.

(124) [(122)] Year--The period of time beginning in January used to determine compliance with the provisions of this chapter. The licensee may change the starting date of the year used to determine compliance by the licensee provided that the change is made at the beginning of the year and that no day is omitted or duplicated in consecutive years.

(c) (No change.)

(d) Records.

(1) Each licensee shall maintain records showing the receipt, transfer, and disposal of all non-exempt sources of radiation.

(A) Records of receipt, transfer, and disposal of sources of radiation shall include as a minimum, the following information:

(i) - (ii) (No change.)

(iii) for the licensee [person] transferring the source of radiation, the name of the transferee, the number of the transferee's radioactive material license authorizing possession of the material, and the regulatory agency issuing the license to the transferee; and

(iv) for the licensee [person] receiving the source of radiation, the name of the transferor, the number of the transferor's radioactive material license authorizing possession of the material, and the regulatory agency issuing the license to the transferor.

(B) (No change.)

(2) - (5) (No change.)

(e) - (f) (No change.)

(g) Tests for leakage and/or contamination of sealed sources.

(1) - (5) (No change.)

(6) The licensee shall immediately withdraw a leaking sealed source from use and shall take action to prevent the spread of contamination. Within two years of the determination that a sealed source is leaking, the [The] leaking sealed source shall be repaired or transferred for disposal in accordance with §289.202 of this title. The licensee shall check the equipment associated with the leaking source for radioactive contamination and, if contaminated, have it decontaminated or disposed of in accordance with §289.202 of this title.

(7) (No change.)

(h) - (j) (No change.)

(k) Communications.

(1) Except where otherwise specified, all communications and reports concerning this chapter and applications filed under them should be addressed to Radiation Control, Department of State Health Services [the Bureau of Radiation Control, Texas Department of Health], 1100 West 49th Street, P.O. Box 149347, Austin, Texas, 78714-9347 [78756-3189]. Communications, reports, and applications may be delivered in person to the agency's office located at 8407 Wall Street, Austin, Texas.

(2) (No change.)

(l) Interpretations. Except as specifically authorized by the agency in writing, no interpretation of the meaning of this chapter by any officer or employee of the agency other than a written interpretation by the Office of General Counsel, Department of State Health Services [Texas Department of Health], will be considered binding upon the agency.

(m) Open records.

(1) (No change.)

(2) Any person who submits written information or data to the agency and requests that the information be considered confidential, privileged, or otherwise not available to the public under the Texas Public Information Act, shall justify such request in writing, including statutes and cases where applicable, addressed to the agency.

(A) Documents containing information that is claimed to fall within an exception to the Texas Public Information Act shall be marked to indicate that fact. Markings shall be placed on the document on origination or submission.

(i) (No change.)

(ii) The following wording shall be placed at the bottom of the front cover and title page, or first page of text if there is no front cover or title page:

Figure: 25 TAC §289.201(m)(2)(A)(ii)

"INFORMATION FALLING WITHIN EXCEPTION OF THE TEXAS PUBLIC INFORMATION ACT, GOVERNMENT CODE, CHAPTER 552---CONFIDENTIAL

This document contains information submitted to Radiation Control, Department of State Health Services [Texas Department of Health, Bureau of Radiation Control]
by _____

(Name of Company) (Name of Submitter)

that is claimed to fall within the following exception to the Texas Public Information Act, Government Code, Chapter 552, Subchapter C _____

(Appropriate Subsection)
WITHHOLD FROM PUBLIC DISCLOSURE

(Signature and Title) (Office) (Date)"

(B) - (C) (No change.)

(3) - (4) (No change.)

(n) - (o) (No change.)

Figure: 25 TAC §289.201(b)(103)

$$\frac{175 \text{ (grams contained U-235)}}{350} + \frac{50 \text{ (grams U-233)}}{200} + \frac{50 \text{ (grams Pu)}}{200} = 1$$

§289.202. Standards for Protection Against Radiation from Radioactive Materials.

(a) - (e) (No change.)

(f) Occupational dose limits for adults.

(1) - (2) (No change.)

(3) When the external exposure is determined by measurement with an external personal monitoring device, the deep-dose equivalent shall be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the agency. The assigned deep dose equivalent shall be for the portion of the body receiving the highest exposure. The assigned shallow-dose equivalent shall be the dose averaged over the contiguous 10 square centimeters (cm^2) of skin receiving the highest exposure.

(4) - (7) (No change.)

(g) - (i) (No change.)

(j) Determination of occupational dose for the current year.

(1) - (3) (No change.)

(4) If the licensee is unable to obtain a complete record of an individual's current occupational dose while employed by any other licensee, the licensee shall assume in

establishing administrative controls in accordance with subsection (f)(7) [(f)(8)] of this section for the current year, that the allowable dose limit for the individual is reduced by 1.25 rems (12.5 millisieverts (mSv)) for each quarter; or 416 mrem (4.16 mSv) for each month for which records were unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure.

(5) - (6) (No change.)

(k) - (o) (No change.)

(p) General surveys and monitoring.

(1) (No change.)

(2) The licensee shall ensure that instruments and equipment used for quantitative radiation measurements, for example, dose rate and effluent monitoring, are operable and calibrated:

(A) - (D) (No change.)

(E) at an accuracy within 20% of the true radiation level, or inclusive of an appropriate efficiency associated with quantitative counting equipment.

(3) - (4) (No change.)

(q) - (x) (No change.)

(y) Security and control of licensed sources of radiation.

(1) - (2) (No change.)

(3) Each portable gauge licensee shall use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal, whenever portable gauges are not under the control and constant surveillance of the licensee.

(z) - (ee) (No change.)

(ff) General requirements for waste management.

(1) Unless otherwise exempted, a licensee shall discharge, treat, or decay licensed material or transfer waste for disposal only:

(A) by transfer to an authorized recipient as provided in subsection (jj) of this section, §289.252 of this title (relating to Licensing of Radioactive Material), **[§289.254 of this title (relating to Licensing of Radioactive Waste Processing and Storage Facilities),]**

§289.257 of this title (relating to Packaging and Transportation of Radioactive Material), §289.259 of this title (relating to Licensing of Naturally Occurring Radioactive Material (NORM)), or to the United States Department of Energy (DOE);

(B) - (C) (No change.)

(D) as authorized in accordance with paragraph (2) of this subsection, and subsections (gg), [and] (hh), and (fff) of this section.

(2) - (3) (No change.)

(4) Licensed material as defined in subsection (b)(15)(C) - (E) of this section may be disposed of in accordance with Title 10, CFR, Part 61, even though it is not defined as low level radioactive waste. Therefore, any licensed byproduct material being disposed of at a facility, or transferred for ultimate disposal at a facility licensed under Title 10, CFR, Part 61, shall meet the requirements of this chapter.

(5) A licensee may dispose of byproduct material, as defined in subsection (b)(15)(C) - (E) of this section, at a disposal facility authorized to dispose of such material in accordance with any Federal or State solid or hazardous waste law.

(6) Any licensee shipping byproduct material as defined in subsection (b)(15)(C) - (E) of this section intended for ultimate disposal at a land disposal facility licensed under Title 10, CFR, Part 61 shall document the information required on the NRC's Uniform Low-Level Radioactive Waste Manifest and transfer this recorded manifest information to the intended consignee in accordance with §289.257(gg) of this title.

(gg) - (kk) (No change.)

(ll) General provisions for records.

(1) - (3) (No change.)

(4) Records required in accordance with §289.201(d) of this title, and subsections (mm) - (oo) and (ss) - (uu) [, (tt), and (uu)] of this section shall include the date and the identification of individual(s) making the record, and, as applicable, a unique identification of survey instrument(s) used, and an exact description of the location of the survey. Records of receipt, transfer, and disposal of sources of radiation shall uniquely identify the source of radiation.

(5) (No change.)

(mm) - (bbb) (No change.)

(ccc) Vacating premises.

(1) (No change.)

(2) The licensee or person possessing non-exempt radioactive material shall decommission the premises to a degree consistent with subsequent use as an unrestricted area and in accordance with the requirements of subsection (ddd) of this section [**or, for uranium recovery and byproduct material disposal facilities licensed in accordance with §289.260 of this title, subsection (eee) of this section.**].

(ddd) Radiological requirements for license termination.

(1) General provisions and scope.

(A) The requirements in this section apply to the decommissioning of facilities licensed in accordance with §289.252 of this title [(**relating to Licensing of Radioactive Material**), **§289.254 of this title (relating to Licensing of Radioactive Waste Processing and Storage Facilities**), §289.255 of this title [(**relating to Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography**)], and §289.258 of this title (relating to Licensing and Radiation Safety Requirements for Irradiators). [**The requirements do not apply to uranium recovery and byproduct material disposal facilities already subject to the requirements of §289.260 of this title (relating to Licensing of Uranium Recovery and Byproduct Material Disposal Facilities.**)]

(B) - (D) (No change.)

(2) - (5) (No change.)

(eee) Limits for contamination of soil, surfaces of facilities and equipment, and vegetation.

(1) (No change.)

(2) No licensee shall possess, receive, use, or transfer radioactive material in such a manner as to cause contamination of soil in unrestricted areas, to the extent that the contamination exceeds, on a dry weight basis, the concentration limits specified in:

(A) subsection (ddd) [**(ggg)(8)**] of this section; or

(B) the effluent concentrations in Table II, Column 2 of subsection (ggg)(2)(F) of this section, with the units changed from microcuries per milliliter to microcuries per gram, for radionuclides not specified in [**subsection (ggg)(8) of this section or**] paragraph (4) of this subsection.

(3) - (6) (No change.)

(fff) Exemption of specific wastes.

(1) - (3) (No change.)

(4) Any licensee[**, except those licensed in accordance with §289.254 of this title,**] may, upon agency approval of procedures required in paragraph (6) of this subsection, discard licensed material included in subsection (ggg)(7) of this section, provided that it does not exceed the concentration and total curie limits contained therein, in a Type I municipal solid waste site as defined in the Municipal Solid Waste Regulations of the authorized regulatory agency (30 Texas Administrative Code Chapter 330), unless such licensed material also contains hazardous waste, as defined in §3(15) of the Solid Waste Disposal Act, Health and Safety Code, Chapter 361. Any licensed material included in subsection (ggg)(7) of this section and which is a hazardous waste as defined in the Solid Waste Disposal Act may be discarded at a facility authorized to manage hazardous waste by the authorized regulatory agency.

(5) - (8) (No change.)

(9) Licensed material discarded under this section is exempt from the requirements of §289.252(ff) [**§289.252(t)**] of this title.

(ggg) Appendices.

(1) (No change.)

(2) Annual limits on intake (ALI) and derived air concentrations (DAC) of radionuclides for occupational exposure; effluent concentrations; concentrations for release to sanitary sewerage.

(A) - (D) (No change.)

(E) List of elements.

Figure: 25 TAC §289.202(ggg)(2)(E) [**Figure: 25 TAC §289.202(ggg)(2)(E)**]

(F) Tables--Values for annual limits. The following tables contain values for annual limits on intake (ALI) and derived air concentrations (DAC) of radionuclides for occupational exposure; effluent concentrations; concentrations for release to sanitary sewerage:

Figure: 25 TAC §289.202(ggg)(2)(F) [**Figure: 25 TAC §289.202(ggg)(2)(F)**]

(3) - (7) (No change.)

[(8) Soil contamination limits for selected radionuclides (for use in subsection (eee) of this section).]

[Figure: 25 TAC §289.202(ggg)(8)]

(8) [9] Cumulative occupational exposure form. The following, BRC Form 202-2, is to be used to document cumulative occupational exposure history: (Please find BRC Form 202-2 at the end of this section.)

Figure: 25 TAC §289.202(ggg)(8) [**Figure: 25 TAC §289.202(ggg)(9)**]

(9) [10] Occupational exposure form. The following, BRC Form 202-3, is to be used to document occupational exposure record for a monitoring period: (Please find BRC Form 202-3 at the end of this section.)

Figure: 25 TAC §289.202(ggg)(9) [**Figure: 25 TAC §289.202(ggg)(10)**]

(hhh) Requirements for nationally tracked sources.

(1) Reports of transactions involving nationally tracked sources. Each licensee who manufactures, transfers, receives, disassembles, or disposes of a nationally tracked source shall complete and submit to NRC a National Source Tracking Transaction Report as specified in the following subparagraphs for each type of transaction.

(A) - (G) (No change.)

(H) Each licensee that possesses Category 1 nationally tracked sources listed in paragraph (2) of this subsection shall report its initial inventory of Category 1 nationally tracked sources to the National Source Tracking System by January 31, 2009 [**November 15, 2007**]. Each licensee that possesses Category 2 nationally tracked sources listed in paragraph (2) of this subsection shall report its initial inventory of Category 2 nationally tracked sources to the National Source Tracking System by January 31, 2009 [**November 30, 2007**]. The information may be submitted to NRC by using any of the methods identified by subparagraph (F)(i) through (iv) of this paragraph. The initial inventory report shall include the following information:

(i) - (vi) (No change.)

(2) - (3) (No change.)

Figure: 25 TAC §289.202(ggg)(2)(E)

Name	Symbol	Atomic Number	Name	Symbol	Atomic Number
Actinium	Ac	89	Mercury	Hg	80
Aluminum	Al	13	Molybdenum	Mo	42
Americium	Am	95	Neodymium	Nd	60
Antimony	Sb	51	Neptunium	Np	93
Argon	Ar	18	Nickel	Ni	28
Arsenic	As	33	Niobium	Nb	41
Astatine	At	85	Nitrogen	N	7
Barium	Ba	56	Osmium	Os	76
Berkelium	Bk	97	Oxygen	O	8
Beryllium	Be	4	Palladium	Pd	46
Bismuth	Bi	83	Phosphorus	P	15
Bromine	Br	35	Platinum	Pt	78
Cadmium	Cd	48	Plutonium	Pu	94
Calcium	Ca	20	Polonium	Po	84
Californium	Cf	98	Potassium	K	19
Carbon	C	6	Praseodymium	Pr	59
Cerium	Ce	58	Promethium	Pm	61
Cesium	Cs	55	Protactinium	Pa	91
Chlorine	Cl	17	Radium	Ra	88
Chromium	Cr	24	Radon	Rn	86
Cobalt	Co	27	Rhodium	Rh	45
Copper	Cu	29	Rubidium	Rb	37
Curium	Cm	96	Ruthenium	Ru	44
Dysprosium	Dy	66	Samarium	Sm	62
Einsteinium	Es	99	Scandium	Sc	21
Erbium	Er	68	Selenium	Se	34
Europium	Eu	63	Silicon	Si	14
Fermium	Fm	100	Silver	Ag	47
Fluorine	F	9	Sodium	Na	11
Francium	Fr	87	Strontium	Sr	38
Gadolinium	Gd	64	Sulfur	S	16
Gallium	Ga	31	Tantalum	Ta	73
Germanium	Ge	32	Technetium	Tc	43
Gold	Au	79	Tellurium	Te	52
Hafnium	Hf	72	Terbium	Tb	65
Holmium	Ho	67	Thallium	Tl	81
Hydrogen	H	1	Thorium	Th	90
Indium	In	49	Thulium	Tm	69
Iodine	I	53	Tin	Sn	50
Iridium	Ir	77	Titanium	Ti	22
Iron	Fe	26	Tungsten	W	74

Name	Symbol	Atomic Number	Name	Symbol	Atomic Number
Krypton	Kr	36	Uranium	U	92
Lanthanum	La	57	Vanadium	V	23
Lead	Pb	82	Xenon	Xe	54
Lutetium	Lu	71	Ytterbium	Yb	70
Magnesium	Mg	12	Yttrium	Y	39
Manganese	Mn	25	Zinc	Zn	30
Mendelevium	Md	101	Zirconium	Zr	40

Figure: 25 TAC §289.202(ggg)(2)(F)

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Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers	
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)	
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)		
1	Hydrogen-3	Water, DAC includes skin absorption	8E+4	8E+4	2E-5	1E-7	1E-3	1E-2
Gas (HT or T ₂) Submersion ¹ : Use above values as HT and T ₂ oxidize in air and in the body to HTO.								
4	Beryllium-7	W, all compounds except those given for Y	4E+4	2E+4	9E-6	3E-8	6E-4	6E-3
		Y, oxides, halides and nitrates	-	2E+4	8E-6	3E-8	-	-
4	Beryllium-10	W, see ⁷ Be	1E+3 LLI wall (1E+3)	2E+2	6E-8	2E-10	-	-
		Y, see ⁷ Be	-	1E+1	6E-9	2E-11	-	-
6	Carbon-11 ²	Monoxide	-	1E+6	5E-4	2E-6	-	-
		Dioxide	-	6E+5	3E-4	9E-7	-	-
		Compounds	4E+5	4E+5	2E-4	6E-7	6E-3	6E-2
6	Carbon-14	Monoxide	-	2E+6	7E-4	2E-6	-	-
		Dioxide	-	2E+5	9E-5	3E-7	-	-
		Compounds	2E+3	2E+3	1E-6	3E-9	3E-5	3E-4
7	Nitrogen-13 ²	Submersion ¹	-	-	4E-6	2E-8	-	-
8	Oxygen-15 ²	Submersion ¹	-	-	4E-6	2E-8	-	-
9	Fluorine-18 ²	D, fluorides of H, Li, Na, K, Rb, Cs and Fr	5E+4 St wall (5E+4)	7E+4	3E-5	1E-7	-	-
		W, fluorides of Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, As, Sb, Bi, Fe, Ru, Os, Co, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, V, Nb, Ta, Mn, Tc and Re	-	9E+4	4E-5	1E-7	-	-
		Y, lanthanum fluoride	-	8E+4	3E-5	1E-7	-	-
11	Sodium-22	D, all compounds	4E+2	6E+2	3E-7	9E-10	6E-6	6E-5
11	Sodium-24	D, all compounds	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4
12	Magnesium-28	D, all compounds except those given for W	7E+2	2E+3	7E-7	2E-9	9E-6	9E-5
		W, oxides, hydroxides, carbides, halides and nitrates	-	1E+3	5E-7	2E-9	-	-
13	Aluminum-26	D, all compounds except those given for W	4E+2	6E+1	3E-8	9E-11	6E-6	6E-5
		W, oxides, hydroxides, carbides, halides and nitrates	-	9E+1	4E-8	1E-10	-	-
14	Silicon-31	D, all compounds except those given for W and Y	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
		W, oxides, hydroxides,						

Table I
Occupational ValuesTable II
Effluent
ConcentrationsTable III
Releases to
Sewers

Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
14 Silicon-32	D, see ^{31}Si	carbides and nitrates	-	3E+4	1E-5	5E-8	-
		Y, aluminosilicate glass	-	3E+4	1E-5	4E-8	-
		2E+3 LLI wall (3E+3)	2E+2	1E-7	3E-10	-	-
15 Phosphorus-32	W, see ^{31}Si	-	-	-	-	4E-5	4E-4
		Y, see ^{31}Si	-	1E+2	5E-8	2E-10	-
15 Phosphorus-33	D, all compounds except phosphates given for W W, phosphates of Zn^{2+} , S^{3+} , Mg^{2+} , Fe^{3+} , Bi^{3+} and lanthanides	6E+2	9E+2	4E-7	1E-9	9E-6	9E-5
		-	4E+2	2E-7	5E-10	-	-
		6E+3	8E+3	4E-6	1E-8	8E-5	8E-4
16 Sulfur-35	W, see ^{32}P	-	3E+3	1E-6	4E-9	-	-
		Vapor	-	1E+4	6E-6	2E-8	-
		D, sulfides and sulfates, except those given for W	1E+4 LLI wall (8E+3)	2E+4	7E-6	2E-8	-
17 Chlorine-36	W, elemental sulfur and sulfides of Sr, Ba, Ge, Sn, Pb, As, Sb, Bi, Cu, Ag, Au, Zn, Cd, Hg, W and Mo. Sulfates of Ca, Sr, Ba, Ra, As, Sb and Bi	6E+3	-	-	-	1E-4	1E-3
		-	2E+3	9E-7	3E-9	-	-
		D, chlorides of H, Li, Na, K, Rb, Cs and Fr	2E+3	2E+3	1E-6	3E-9	2E-5
17 Chlorine-38 ²	W, chlorides of lanthanides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Tc, and Re	2E+4 St wall (3E+4)	4E+4	2E-5	6E-8	-	-
		-	-	-	-	3E-4	3E-3
		W, see ^{36}Cl	-	5E+4	2E-5	6E-8	-
17 Chlorine-39 ²	D, see ^{36}Cl	2E+4 St wall (4E+4)	5E+4	2E-5	7E-8	-	-
		W, see ^{36}Cl	-	6E+4	2E-5	8E-8	-
18 Argon-37	Submersion ¹	-	-	1E+0	6E-3	-	-
18 Argon-39	Submersion ¹	-	-	2E-4	8E-7	-	-
18 Argon-41	Submersion ¹	-	-	3E-6	1E-8	-	-
19 Potassium-40	D, all compounds	3E+2	4E+2	2E-7	6E-10	4E-6	4E-5
19 Potassium-42	D, all compounds	5E+3	5E+3	2E-6	7E-9	6E-5	6E-4

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers	
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)	
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)				
19	Potassium-43	D, all compounds	6E+3	9E+3	4E-6	1E-8	9E-5	9E-4
19	Potassium-44 ²	D, all compounds	2E+4 St wall (4E+4)	7E+4	3E-5	9E-8	-	-
19	Potassium-45 ²	D, all compounds	3E+4 St wall (5E+4)	1E+5	5E-5	2E-7	-	-
20	Calcium-41	W, all compounds	3E+3 Bone surf (4E+3)	4E+3 Bone surf (4E+3)	2E-6	-	7E-4	7E-3
20	Calcium-45	W, all compounds	2E+3	8E+2	4E-7	1E-9	2E-5	2E-4
20	Calcium-47	W, all compounds	8E+2	9E+2	4E-7	1E-9	1E-5	1E-4
21	Scandium-43	Y, all compounds	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
21	Scandium-44m	Y, all compounds	5E+2	7E+2	3E-7	1E-9	7E-6	7E-5
21	Scandium-44	Y, all compounds	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4
21	Scandium-46	Y, all compounds	9E+2	2E+2	1E-7	3E-10	1E-5	1E-4
21	Scandium-47	Y, all compounds	2E+3 LLI wall (3E+3)	3E+3	1E-6	4E-9	-	-
21	Scandium-48	Y, all compounds	8E+2	1E+3	6E-7	2E-9	1E-5	1E-4
21	Scandium-49 ²	Y, all compounds	2E+4	5E+4	2E-5	8E-8	3E-4	3E-3
22	Titanium-44	D, all compounds except those given for W and Y W, oxides, hydroxides, carbides, halides and nitrates Y, SrTiO	3E+2 - -	1E+1 3E+1 6E+0	5E-9 1E-8 2E-9	2E-11 4E-11 8E-12	4E-6 - -	4E-5 - -
22	Titanium-45	D, see ⁴⁴ Ti W, see ⁴⁴ Ti Y, see ⁴⁴ Ti	9E+3 - -	3E+4 4E+4 3E+4	1E-5 1E-5 1E-5	3E-8 5E-8 4E-8	1E-4 - -	1E-3 - -
23	Vanadium-47 ²	D, all compounds except those given for W W, oxides, hydroxides, carbides and halides	3E+4 - -	8E+4 - 1E+5	3E-5 - 4E-5	1E-7 - 1E-7	- 4E-4 -	- - -
23	Vanadium-48	D, see ⁴⁷ V W, see ⁴⁷ V	6E+2 -	1E+3 6E+2	5E-7 3E-7	2E-9 9E-10	9E-6 -	9E-5 -
23	Vanadium-49	D, see ⁴⁷ V W, see ⁴⁷ V	7E+4 - -	3E+4 (3E+4) 2E+4	1E-5 - 8E-6	- 5E-8 2E-8	- 1E-3 -	- - -
24	Chromium-48	D, all compounds except						

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2		Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
	those given for W and Y	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
	W, halides and nitrates	-	7E+3	3E-6	1E-8	-	-
	Y, oxides and hydroxides	-	7E+3	3E-6	1E-8	-	-
24	Chromium-49 ²	D, see ⁴⁸ Cr	3E+4	8E+4	4E-5	1E-7	4E-4
	W, see ⁴⁸ Cr	-	1E+5	4E-5	1E-7	-	-
	Y, see ⁴⁸ Cr	-	9E+4	4E-5	1E-7	-	-
24	Chromium-51	D, see ⁴⁸ Cr	4E+4	5E+4	2E-5	6E-8	5E-4
	W, see ⁴⁸ Cr	-	2E+4	1E-5	3E-8	-	-
	Y, see ⁴⁸ Cr	-	2E+4	8E-6	3E-8	-	-
25	Manganese-51 ²	D, all compounds except those given for W	2E+4	5E+4	2E-5	7E-8	3E-4
	W, oxides, hydroxides, halides and nitrates	-	6E+4	3E-5	8E-8	-	-
25	Manganese-52m ²	D, see ⁵¹ Mn	3E+4 St wall (4E+4)	9E+4	4E-5	1E-7	-
	W, see ⁵¹ Mn	-	1E+5	4E-5	1E-7	5E-4	5E-3
25	Manganese-52	D, see ⁵¹ Mn	7E+2	1E+3	5E-7	2E-9	1E-5
	W, see ⁵¹ Mn	-	9E+2	4E-7	1E-9	-	-
25	Manganese-53	D, see ⁵¹ Mn	5E+4	1E+4 Bone surf	5E-6	-	7E-4
	W, see ⁵¹ Mn	-	(2E+4)	-	3E-8	-	-
		-	1E+4	5E-6	2E-8	-	-
25	Manganese-54	D, see ⁵¹ Mn	2E+3	9E+2	4E-7	1E-9	3E-5
	W, see ⁵¹ Mn	-	8E+2	3E-7	1E-9	-	-
25	Manganese-56	D, see ⁵¹ Mn	5E+3	2E+4	6E-6	2E-8	7E-5
	W, see ⁵¹ Mn	-	2E+4	9E-6	3E-8	-	-
26	Iron-52	D, all compounds except those given for W	9E+2	3E+3	1E-6	4E-9	1E-5
	W, oxides, hydroxides and halides	-	2E+3	1E-6	3E-9	-	-
26	Iron-55	D, see ⁵² Fe	9E+3	2E+3	8E-7	3E-9	1E-4
	W, see ⁵² Fe	-	4E+3	2E-6	6E-9	-	-
26	Iron-59	D, see ⁵² Fe	8E+2	3E+2	1E-7	5E-10	1E-5
	W, see ⁵² Fe	-	5E+2	2E-7	7E-10	-	-
26	Iron-60	D, see ⁵² Fe	3E+1	6E+0	3E-9	9E-12	4E-7
	W, see ⁵² Fe	-	2E+1	8E-9	3E-11	-	-
27	Cobalt-55	W, all compounds except those given for Y	1E+3	3E+3	1E-6	4E-9	2E-5
	Y, oxides, hydroxides, halides and nitrates	-	3E+3	1E-6	4E-9	-	-
27	Cobalt-56	W, see ⁵⁵ Co	5E+2	3E+2	1E-7	4E-10	6E-6
	Y, see ⁵⁵ Co	4E+2	2E+2	8E-8	3E-10	-	-
27	Cobalt-57	W, see ⁵⁵ Co	8E+3	3E+3	1E-6	4E-9	6E-5
	Y, see ⁵⁵ Co	4E+3	7E+2	3E-7	9E-10	-	-

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)	
			Inhalation					
		ALI (μ Ci)	DAC (μ Ci/ml)					
27	Cobalt-58m	W, see ^{55}Co Y, see ^{55}Co	6E+4 -	9E+4 6E+4	4E-5 3E-5	1E-7 9E-8	8E-4 -	8E-3 -
27	Cobalt-58	W, see ^{55}Co Y, see ^{55}Co	2E+3 1E+3	1E+3 7E+2	5E-7 3E-7	2E-9 1E-9	2E-5 -	2E-4 -
27	Cobalt-60m ²	W, see ^{55}Co	1E+6 St wall (1E+6)	4E+6	2E-3	6E-6	-	-
		Y, see ^{55}Co	-	3E+6	1E-3	4E-6	2E-2	2E-1
27	Cobalt-60	W, see ^{55}Co Y, see ^{55}Co	5E+2 2E+2	2E+2 3E+1	7E-8 1E-8	2E-10 5E-11	3E-6 -	3E-5 -
27	Cobalt-61 ²	W, see ^{55}Co Y, see ^{55}Co	2E+4 2E+4	6E+4 6E+4	3E-5 2E-5	9E-8 8E-8	3E-4 -	3E-3 -
27	Cobalt-62m ²	W, see ^{55}Co	4E+4 St wall (5E+4)	2E+5	7E-5	2E-7	-	-
		Y, see ^{55}Co	-	2E+5	6E-5	2E-7	7E-4	7E-3
28	Nickel-56	D, all compounds except those given for W W, oxides, hydroxides and carbides Vapor	1E+3	2E+3	8E-7	3E-9	2E-5	2E-4
28	Nickel-57	D, see ^{56}Ni W, see ^{56}Ni Vapor	2E+3 - -	5E+3 3E+3 6E+3	2E-6 1E-6 3E-6	7E-9 4E-9 9E-9	2E-5 - -	2E-4 - -
28	Nickel-59	D, see ^{56}Ni W, see ^{56}Ni Vapor	2E+4 - -	4E+3 7E+3 2E+3	2E-6 3E-6 8E-7	5E-9 1E-8 3E-9	3E-4 - -	3E-3 - -
28	Nickel-63	D, see ^{56}Ni W, see ^{56}Ni Vapor	9E+3 - -	2E+3 3E+3 8E+2	7E-7 1E-6 3E-7	2E-9 4E-9 1E-9	1E-4 - -	1E-3 - -
28	Nickel-65	D, see ^{56}Ni W, see ^{56}Ni Vapor	8E+3 - -	2E+4 3E+4 2E+4	1E-5 1E-5 7E-6	3E-8 4E-8 2E-8	1E-4 - -	1E-3 - -
28	Nickel-66	D, see ^{56}Ni	4E+2	2E+3	7E-7	2E-9	-	-
		W, see ^{56}Ni	-	-	-	-	6E-6	6E-5
		Vapor	-	6E+2 3E+3	3E-7 1E-6	9E-10 4E-9	-	-
29	Copper-60 ²	D, all compounds except those given for W and Y	3E+4 St wall (3E+4)	9E+4	4E-5	1E-7	-	-
		W, sulfides, halides and nitrates	-	-	-	-	4E-4	4E-3
		Y, oxides and hydroxides-	1E+5	4E-5	1E-7	-	-	-
29	Copper-61	D, see ^{60}Cu W, see ^{60}Cu	1E+4 -	3E+4 4E+4	1E-5 2E-5	4E-8 6E-8	2E-4 -	2E-3 -

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation				
		ALI (μ Ci)	DAC (μ Ci/ml)				
	Y, see ^{60}Cu	-	4E+4	1E-5	5E-8	-	-
29	Copper-64	D, see ^{60}Cu	1E+4	3E+4	1E-5	4E-8	2E-3
	W, see ^{60}Cu	-	2E+4	1E-5	3E-8	-	-
	Y, see ^{60}Cu	-	2E+4	9E-6	3E-8	-	-
29	Copper-67	D, see ^{60}Cu	5E+3	8E+3	3E-6	1E-8	6E-5
	W, see ^{60}Cu	-	5E+3	2E-6	7E-9	-	-
	Y, see ^{60}Cu	-	5E+3	2E-6	6E-9	-	-
30	Zinc-62	Y, all compounds	1E+3	3E+3	1E-6	4E-9	2E-5
30	Zinc-63 ²	Y, all compounds	2E+4 St wall (3E+4)	7E+4	3E-5	9E-8	-
		-	-	-	-	3E-4	3E-3
30	Zinc-65	Y, all compounds	4E+2	3E+2	1E-7	4E-10	5E-6
30	Zinc-69m	Y, all compounds	4E+3	7E+3	3E-6	1E-8	6E-5
30	Zinc-69 ²	Y, all compounds	6E+4	1E+5	6E-5	2E-7	8E-4
30	Zinc-71m	Y, all compounds	6E+3	2E+4	7E-6	2E-8	8E-5
30	Zinc-72	Y, all compounds	1E+3	1E+3	5E-7	2E-9	1E-5
31	Gallium-65 ²	D, all compounds except those given for W	5E+4 St wall (6E+4)	2E+5	7E-5	2E-7	-
		-	-	-	-	9E-4	9E-3
		W, oxides, hydroxides, carbides, halides and nitrates	-	2E+5	8E-5	3E-7	-
31	Gallium-66	D, see ^{65}Ga	1E+3	4E+3	1E-6	5E-9	1E-5
		W, see ^{65}Ga	-	3E+3	1E-6	4E-9	-
31	Gallium-67	D, see ^{65}Ga	7E+3	1E+4	6E-6	2E-8	1E-4
		W, see ^{65}Ga	-	1E+4	4E-6	1E-8	-
31	Gallium-68 ²	D, see ^{65}Ga	2E+4	4E+4	2E-5	6E-8	2E-4
		W, see ^{65}Ga	-	5E+4	2E-5	7E-8	-
31	Gallium-70 ²	D, see ^{65}Ga	5E+4 St wall (7E+4)	2E+5	7E-5	2E-7	-
		-	-	-	-	1E-3	1E-2
		W, see ^{65}Ga	-	2E+5	8E-5	3E-7	-
31	Gallium-72	D, see ^{65}Ga	1E+3	4E+3	1E-6	5E-9	2E-5
		W, see ^{65}Ga	-	3E+3	1E-6	4E-9	-
31	Gallium-73	D, see ^{65}Ga	5E+3	2E+4	6E-6	2E-8	7E-5
		W, see ^{65}Ga	-	2E+4	6E-6	2E-8	-
32	Germanium-66	D, all compounds except those given for W	2E+4	3E+4	1E-5	4E-8	3E-4
		W, oxides, sulfides and halides	-	2E+4	8E-6	3E-8	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
32	Germanium-67 ²	D, see ⁶⁶ Ge	3E+4 St wall (4E+4)	9E+4	4E-5	1E-7	-
		W, see ⁶⁶ Ge	-	1E+5	4E-5	1E-7	6E-4 6E-3
32	Germanium-68	D, see ⁶⁶ Ge	5E+3	4E+3	2E-6	5E-9	6E-5 6E-4
		W, see ⁶⁶ Ge	-	1E+2	4E-8	1E-10	-
32	Germanium-69	D, see ⁶⁶ Ge	1E+4	2E+4	6E-6	2E-8	2E-4 2E-3
		W, see ⁶⁶ Ge	-	8E+3	3E-6	1E-8	-
32	Germanium-71	D, see ⁶⁶ Ge	5E+5	4E+5	2E-4	6E-7	7E-3 7E-2
		W, see ⁶⁶ Ge	-	4E+4	2E-5	6E-8	-
32	Germanium-75 ²	D, see ⁶⁶ Ge	4E+4 St wall (7E+4)	8E+4	3E-5	1E-7	-
		W, see ⁶⁶ Ge	-	8E+4	4E-5	1E-7	9E-4 9E-3
32	Germanium-77	D, see ⁶⁶ Ge	9E+3	1E+4	4E-6	1E-8	1E-4 1E-3
		W, see ⁶⁶ Ge	-	6E+3	2E-6	8E-9	-
32	Germanium-78 ²	D, see ⁶⁶ Ge	2E+4 St wall (2E+4)	2E+4	9E-6	3E-8	-
		W, see ⁶⁶ Ge	-	2E+4	9E-6	3E-8	3E-4 3E-3
33	Arsenic-69 ²	W, all compounds	3E+4 St wall (4E+4)	1E+5	5E-5	2E-7	-
			-	-	-	6E-4	6E-3
33	Arsenic-70 ²	W, all compounds	1E+4	5E+4	2E-5	7E-8	2E-4 2E-3
33	Arsenic-71	W, all compounds	4E+3	5E+3	2E-6	6E-9	5E-5 5E-4
33	Arsenic-72	W, all compounds	9E+2	1E+3	6E-7	2E-9	1E-5 1E-4
33	Arsenic-73	W, all compounds	8E+3	2E+3	7E-7	2E-9	1E-4 1E-3
33	Arsenic-74	W, all compounds	1E+3	8E+2	3E-7	1E-9	2E-5 2E-4
33	Arsenic-76	W, all compounds	1E+3	1E+3	6E-7	2E-9	1E-5 1E-4
33	Arsenic-77	W, all compounds	4E+3 LLI wall (5E+3)	5E+3	2E-6	7E-9	-
33	Arsenic-78 ²	W, all compounds	8E+3	2E+4	9E-6	3E-8	1E-4 1E-3
34	Selenium-70 ²	D, all compounds except those given for W	2E+4	4E+4	2E-5	5E-8	1E-4 1E-3
		W, oxides, hydroxides, carbides and elemental Se	1E+4	4E+4	2E-5	6E-8	-
34	Selenium-73m ²	D, see ⁷⁰ Se	6E+4	2E+5	6E-5	2E-7	4E-4 4E-3
		W, see ⁷⁰ Se	3E+4	1E+5	6E-5	2E-7	-
34	Selenium-73	D, see ⁷⁰ Se	3E+3	1E+4	5E-6	2E-8	4E-5 4E-4
		W, see ⁷⁰ Se	-	2E+4	7E-6	2E-8	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
34	Selenium-75	D, see ^{70}Se W, see ^{70}Se	5E+2 -	7E+2 6E+2	3E-7 3E-7	1E-9 8E-10	7E-6 -
34	Selenium-79	D, see ^{70}Se W, see ^{70}Se	6E+2 -	8E+2 6E+2	3E-7 2E-7	1E-9 8E-10	8E-5 -
34	Selenium-81m ²	D, see ^{70}Se W, see ^{70}Se	4E+4 2E+4	7E+4 7E+4	3E-5 3E-5	9E-8 1E-7	3E-4 -
34	Selenium-81 ²	D, see ^{70}Se	6E+4	2E+5	9E-5	3E-7	-
		W, see ^{70}Se	St wall (8E+4) -	- 2E+5	- 1E-4	- 3E-7	1E-3 -
34	Selenium-83 ²	D, see ^{70}Se W, see ^{70}Se	4E+4 3E+4	1E+5 1E+5	5E-5 5E-5	2E-7 2E-7	4E-4 -
35	Bromine-74m ²	D, bromides of H, Li, Na, K, Rb, Cs and Fr	1E+4 St wall (2E+4)	4E+4	2E-5	5E-8	-
		W, bromides of lantha- nides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Mn, Tc and Re	-	4E+4	2E-5	6E-8	-
35	Bromine-74 ²	D, see $^{74\text{m}}\text{Br}$	2E+4 St wall (4E+4)	7E+4	3E-5	1E-7	-
		W, see $^{74\text{m}}\text{Br}$	-	-	-	5E-4	5E-3
35	Bromine-75 ²	D, see $^{74\text{m}}\text{Br}$	3E+4 St wall (4E+4)	5E+4	2E-5	7E-8	-
		W, see $^{74\text{m}}\text{Br}$	-	-	-	5E-4	5E-3
35	Bromine-76	D, see $^{74\text{m}}\text{Br}$ W, see $^{74\text{m}}\text{Br}$	4E+3 -	5E+3 4E+3	2E-6 2E-6	7E-9 6E-9	5E-5 -
35	Bromine-77	D, see $^{74\text{m}}\text{Br}$ W, see $^{74\text{m}}\text{Br}$	2E+4 -	2E+4 2E+4	1E-5 8E-6	3E-8 3E-8	2E-4 -
35	Bromine-80m	D, see $^{74\text{m}}\text{Br}$ W, see $^{74\text{m}}\text{Br}$	2E+4 -	2E+4 1E+4	7E-6 6E-6	2E-8 2E-8	3E-4 -
35	Bromine-80 ²	D, see $^{74\text{m}}\text{Br}$	5E+4 St wall (9E+4)	2E+5	8E-5	3E-7	-
		W, see $^{74\text{m}}\text{Br}$	-	2E+5	9E-5	3E-7	1E-3 -
35	Bromine-82	D, see $^{74\text{m}}\text{Br}$ W, see $^{74\text{m}}\text{Br}$	3E+3 -	4E+3 4E+3	2E-6 2E-6	6E-9 5E-9	4E-5 -
35	Bromine-83	D, see $^{74\text{m}}\text{Br}$	5E+4 St wall	6E+4	3E-5	9E-8	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
	W, see 74m Br	(7E+4)	-	-	-	9E-4	9E-3
	-	-	6E+4	3E-5	9E-8	-	-
35	Bromine-84 ²	D, see 74m Br	2E+4 St wall (3E+4)	6E+4	2E-5	8E-8	-
	W, see 74m Br	-	-	-	-	4E-4	4E-3
	-	-	6E+4	3E-5	9E-8	-	-
36	Krypton-74 ²	Submersion ¹	-	-	3E-6	1E-8	-
36	Krypton-76	Submersion ¹	-	-	9E-6	4E-8	-
36	Krypton-77 ²	Submersion ¹	-	-	4E-6	2E-8	-
36	Krypton-79	Submersion ¹	-	-	2E-5	7E-8	-
36	Krypton-81	Submersion ¹	-	-	7E-4	3E-6	-
36	Krypton-83m ²	Submersion ¹	-	-	1E-2	5E-5	-
36	Krypton-85m	Submersion ¹	-	-	2E-5	1E-7	-
36	Krypton-85	Submersion ¹	-	-	1E-4	7E-7	-
36	Krypton-87 ²	Submersion ¹	-	-	5E-6	2E-8	-
36	Krypton-88	Submersion ¹	-	-	2E-6	9E-9	-
37	Rubidium-79 ²	D, all compounds	4E+4 St wall (6E+4)	1E+5	5E-5	2E-7	-
	-	-	-	-	-	8E-4	8E-3
37	Rubidium-81m ²	D, all compounds	2E+5 St wall (3E+5)	3E+5	1E-4	5E-7	-
	-	-	-	-	-	4E-3	4E-2
37	Rubidium-81	D, all compounds	4E+4	5E+4	2E-5	7E-8	5E-4
37	Rubidium-82m	D, all compounds	1E+4	2E+4	7E-6	2E-8	2E-4
37	Rubidium-83	D, all compounds	6E+2	1E+3	4E-7	1E-9	9E-6
37	Rubidium-84	D, all compounds	5E+2	8E+2	3E-7	1E-9	7E-6
37	Rubidium-86	D, all compounds	5E+2	8E+2	3E-7	1E-9	7E-6
37	Rubidium-87	D, all compounds	1E+3	2E+3	6E-7	2E-9	1E-5
37	Rubidium-88 ²	D, all compounds	2E+4 St wall (3E+4)	6E+4	3E-5	9E-8	-
	-	-	-	-	-	4E-4	4E-3
37	Rubidium-89 ²	D, all compounds	4E+4 St wall (6E+4)	1E+5	6E-5	2E-7	-
	-	-	-	-	-	9E-4	9E-3
38	Strontium-80 ²	D, all soluble compounds except SrTiO _Y , all insoluble compounds and SrTiO	4E+3	1E+4	5E-6	2E-8	6E-5
	-	-	1E+4	5E-6	2E-8	-	-

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			Inhalation		DAC (μ Ci/ml)		
38	Strontium-81 ²	D, see ⁸⁰ Sr Y, see ⁸⁰ Sr	3E+4 2E+4	8E+4 8E+4	3E-5 3E-5	1E-7 1E-7	3E-4 -
38	Strontium-82	D, see ⁸⁰ Sr	3E+2 LLI wall (2E+2)	4E+2	2E-7	6E-10	-
		Y, see ⁸⁰ Sr	2E+2	9E+1	4E-8	1E-10	3E-6 3E-5
38	Strontium-83	D, see ⁸⁰ Sr Y, see ⁸⁰ Sr	3E+3 2E+3	7E+3 4E+3	3E-6 1E-6	1E-8 5E-9	3E-5 -
38	Strontium-85m ²	D, see ⁸⁰ Sr Y, see ⁸⁰ Sr	2E+5 -	6E+5 8E+5	3E-4 4E-4	9E-7 1E-6	3E-3 -
38	Strontium-85	D, see ⁸⁰ Sr Y, see ⁸⁰ Sr	3E+3 -	3E+3 2E+3	1E-6 6E-7	4E-9 2E-9	4E-5 -
38	Strontium-87m	D, see ⁸⁰ Sr Y, see ⁸⁰ Sr	5E+4 4E+4	1E+5 2E+5	5E-5 6E-5	2E-7 2E-7	6E-4 -
38	Strontium-89	D, see ⁸⁰ Sr	6E+2 LLI wall (6E+2)	8E+2	4E-7	1E-9	-
		Y, see ⁸⁰ Sr	5E+2	1E+2	6E-8	2E-10	8E-6 8E-5
38	Strontium-90	D, see ⁸⁰ Sr	3E+1 Bone surf (4E+1)	2E+1 Bone surf (2E+1)	8E-9	-	-
		Y, see ⁸⁰ Sr	-	4E+0	2E-9	3E-11 6E-12	5E-7 -
38	Strontium-91	D, see ⁸⁰ Sr Y, see ⁸⁰ Sr	2E+3 -	6E+3 4E+3	2E-6 1E-6	8E-9 5E-9	2E-5 -
38	Strontium-92	D, see ⁸⁰ Sr Y, see ⁸⁰ Sr	3E+3 -	9E+3 7E+3	4E-6 3E-6	1E-8 9E-9	4E-5 -
39	Yttrium-86m ²	W, all compounds except those given for Y Y, oxides and hydroxides-	2E+4 5E+4	6E+4 2E-5	2E-5 8E-8	8E-8 -	3E-4 -
39	Yttrium-86	W, see ^{86m} Y Y, see ^{86m} Y	1E+3 -	3E+3 3E+3	1E-6 1E-6	5E-9 5E-9	2E-5 -
39	Yttrium-87	W, see ^{86m} Y Y, see ^{86m} Y	2E+3 -	3E+3 3E+3	1E-6 1E-6	5E-9 5E-9	3E-5 -
39	Yttrium-88	W, see ^{86m} Y Y, see ^{86m} Y	1E+3 -	3E+2 2E+2	1E-7 1E-7	3E-10 3E-10	1E-5 -
39	Yttrium-90m	W, see ^{86m} Y Y, see ^{86m} Y	8E+3 -	1E+4 1E+4	5E-6 5E-6	2E-8 2E-8	1E-4 -
39	Yttrium-90	W, see ^{86m} Y	4E+2 LLI wall (5E+2)	7E+2	3E-7	9E-10	-
		Y, see ^{86m} Y	-	6E+2	3E-7	9E-10	7E-6 -
39	Yttrium-91m ²	W, see ^{86m} Y Y, see ^{86m} Y	1E+5 -	2E+5 2E+5	1E-4 7E-5	3E-7 2E-7	2E-3 -
39	Yttrium-91	W, see ^{86m} Y	5E+2	2E+2	7E-8	2E-10	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers	
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)	
39	Yttrium-92	W, see ^{86m}Y Y, see ^{86m}Y	LLI wall (6E+2)	-	-	-	8E-6	8E-5
			-	1E+2	5E-8	2E-10	-	-
39	Yttrium-93	W, see ^{86m}Y Y, see ^{86m}Y	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
			-	8E+3	3E-6	1E-8	-	-
39	Yttrium-94 ²	W, see ^{86m}Y	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
			-	2E+3	1E-6	3E-9	-	-
39	Yttrium-95 ²	W, see ^{86m}Y	2E+4	8E+4	3E-5	1E-7	-	-
			St wall (3E+4)	-	-	-	4E-4	4E-3
40	Zirconium-86	Y, see ^{86m}Y	-	8E+4	3E-5	1E-7	-	-
			-	-	-	-	-	-
40	Zirconium-88	D, all compounds except those given for W and Y	1E+3	4E+3	2E-6	6E-9	2E-5	2E-4
		W, oxides, hydroxides, halides and nitrates	-	3E+3	1E-6	4E-9	-	-
		Y, carbide	-	2E+3	1E-6	3E-9	-	-
40	Zirconium-89	D, see ^{86}Zr	4E+3	2E+2	9E-8	3E-10	5E-5	5E-4
		W, see ^{86}Zr	-	5E+2	2E-7	7E-10	-	-
		Y, see ^{86}Zr	-	3E+2	1E-7	4E-10	-	-
40	Zirconium-93	D, see ^{86}Zr	2E+3	4E+3	1E-6	5E-9	2E-5	2E-4
		W, see ^{86}Zr	-	2E+3	1E-6	3E-9	-	-
		Y, see ^{86}Zr	-	2E+3	1E-6	3E-9	-	-
		W, see ^{86}Zr	1E+3	6E+0 Bone surf (3E+3)	3E-9	-	-	-
			-	(2E+1)	-	2E-11	4E-5	4E-4
			-	Bone surf (6E+1)	-	9E-11	-	-
40	Zirconium-95	Y, see ^{86}Zr	-	6E+1	2E-8	-	-	-
		Y, see ^{86}Zr	-	Bone surf (7E+1)	-	9E-11	-	-
			-	-	-	-	-	-
40	Zirconium-97	D, see ^{86}Zr	1E+3	1E+2 Bone surf (3E+2)	5E-8	-	2E-5	2E-4
		W, see ^{86}Zr	-	(3E+2)	-	4E-10	-	-
		Y, see ^{86}Zr	-	4E+2	2E-7	5E-10	-	-
41	Niobium-88 ²	D, see ^{86}Zr	6E+2	2E+3	8E-7	3E-9	9E-6	9E-5
		W, see ^{86}Zr	-	1E+3	6E-7	2E-9	-	-
		Y, see ^{86}Zr	-	1E+3	5E-7	2E-9	-	-
41	Niobium-89 ²	W, all compounds except those given for Y	5E+4 St wall (7E+4)	2E+5	9E-5	3E-7	-	-
		Y, oxides and hydroxides	-	-	-	-	1E-3	1E-2
41	Niobium-89 ²	W, see ^{88}Nb	2E+5	9E-5	3E-7	-	-	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
	(66 min)						
	Y, see ^{88}Nb	-	4E+4	2E-5	5E-8	-	-
41	Niobium-89 (122 min)	W, see ^{88}Nb	5E+3	2E+4	8E-6	3E-8	7E-5
	Y, see ^{88}Nb	-	2E+4	6E-6	2E-8	-	-
41	Niobium-90	W, see ^{88}Nb	1E+3	3E+3	1E-6	4E-9	1E-5
	Y, see ^{88}Nb	-	2E+3	1E-6	3E-9	-	-
41	Niobium-93m	W, see ^{88}Nb	9E+3 LLI wall (1E+4)	2E+3	8E-7	3E-9	-
	Y, see ^{88}Nb	-	2E+2	7E-8	2E-10	2E-4	2E-3
41	Niobium-94	W, see ^{88}Nb	9E+2	2E+2	8E-8	3E-10	1E-5
	Y, see ^{88}Nb	-	2E+1	6E-9	2E-11	-	-
41	Niobium-95m	W, see ^{88}Nb	2E+3 LLI wall (2E+3)	3E+3	1E-6	4E-9	-
	Y, see ^{88}Nb	-	2E+3	9E-7	3E-9	3E-5	3E-4
41	Niobium-95	W, see ^{88}Nb	2E+3	1E+3	5E-7	2E-9	3E-5
	Y, see ^{88}Nb	-	1E+3	5E-7	2E-9	-	-
41	Niobium-96	W, see ^{88}Nb	1E+3	3E+3	1E-6	4E-9	2E-5
	Y, see ^{88}Nb	-	2E+3	1E-6	3E-9	-	-
41	Niobium-97 ²	W, see ^{88}Nb	2E+4	8E+4	3E-5	1E-7	3E-4
	Y, see ^{88}Nb	-	7E+4	3E-5	1E-7	-	-
41	Niobium-98 ²	W, see ^{88}Nb	1E+4	5E+4	2E-5	8E-8	2E-4
	Y, see ^{88}Nb	-	5E+4	2E-5	7E-8	-	-
42	Molybdenum-90	D, all compounds except those given for Y Y, oxides, hydroxides and MoS	4E+3	7E+3	3E-6	1E-8	3E-5
		2E+3	5E+3	2E-6	6E-9	-	-
42	Molybdenum-93m	D, see ^{90}Mo	9E+3	2E+4	7E-6	2E-8	6E-5
	Y, see ^{90}Mo	4E+3	1E+4	6E-6	2E-8	-	-
42	Molybdenum-93	D, see ^{90}Mo	4E+3	5E+3	2E-6	8E-9	5E-5
	Y, see ^{90}Mo	2E+4	2E+2	8E-8	2E-10	-	-
42	Molybdenum-99	D, see ^{90}Mo	2E+3 LLI wall (1E+3)	3E+3	1E-6	4E-9	-
	Y, see ^{90}Mo	1E+3	1E+3	6E-7	2E-9	2E-5	2E-4
42	Molybdenum-101 ²	D, see ^{90}Mo	4E+4 St wall (5E+4)	1E+5	6E-5	2E-7	-
	Y, see ^{90}Mo	-	1E+5	6E-5	2E-7	7E-4	7E-3
43	Technetium-93m ²	D, all compounds except those given for W W, oxides, hydroxides, halides and nitrates	7E+4	2E+5	6E-5	2E-7	1E-3
		-	3E+5	1E-4	4E-7	-	-

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)	
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)		
43	Technetium-93	D, see 93m Tc W, see 93m Tc	3E+4 -	7E+4 1E+5	3E-5 4E-5	1E-7 1E-7	4E-4 -	4E-3 -
43	Technetium-94m ²	D, see 93m Tc W, see 93m Tc	2E+4 -	4E+4 6E+4	2E-5 2E-5	6E-8 8E-8	3E-4 -	3E-3 -
43	Technetium-94	D, see 93m Tc W, see 93m Tc	9E+3 -	2E+4 2E+4	8E-6 1E-5	3E-8 3E-8	1E-4 -	1E-3 -
43	Technetium-95m	D, see 93m Tc W, see 93m Tc	4E+3 -	5E+3 2E+3	2E-6 8E-7	8E-9 3E-9	5E-5 -	5E-4 -
43	Technetium-95	D, see 93m Tc W, see 93m Tc	1E+4 -	2E+4 2E+4	9E-6 8E-6	3E-8 3E-8	1E-4 -	1E-3 -
43	Technetium-96m ²	D, see 93m Tc W, see 93m Tc	2E+5 -	3E+5 2E+5	1E-4 1E-4	4E-7 3E-7	2E-3 -	2E-2 -
43	Technetium-96	D, see 93m Tc W, see 93m Tc	2E+3 -	3E+3 2E+3	1E-6 9E-7	5E-9 3E-9	3E-5 -	3E-4 -
43	Technetium-97m	D, see 93m Tc W, see 93m Tc	5E+3 - St wall - W, see 93m Tc	7E+3 (7E+3) 1E+3	3E-6 - 5E-7	- 1E-8 2E-9	6E-5 - -	6E-4 - -
43	Technetium-97	D, see 93m Tc W, see 93m Tc	4E+4 -	5E+4 6E+3	2E-5 2E-6	7E-8 8E-9	5E-4 -	5E-3 -
43	Technetium-98	D, see 93m Tc W, see 93m Tc	1E+3 -	2E+3 3E+2	7E-7 1E-7	2E-9 4E-10	1E-5 -	1E-4 -
43	Technetium-99m	D, see 93m Tc W, see 93m Tc	8E+4 -	2E+5 2E+5	6E-5 1E-4	2E-7 3E-7	1E-3 -	1E-2 -
43	Technetium-99	D, see 93m Tc W, see 93m Tc	4E+3 - St wall - W, see 93m Tc	5E+3 (6E+3) 7E+2	2E-6 - 3E-7	- 8E-9 9E-10	6E-5 - -	6E-4 - -
43	Technetium-101 ²	D, see 93m Tc W, see 93m Tc	9E+4 - St wall (1E+5)	3E+5 - 4E+5	1E-4 - 2E-4	5E-7 - 5E-7	- 2E-3 -	- 2E-2 -
43	Technetium-104 ²	D, see 93m Tc W, see 93m Tc	2E+4 - St wall (3E+4)	7E+4 - 9E+4	3E-5 - 4E-5	1E-7 - 1E-7	- 4E-4 -	- 4E-3 -
44	Ruthenium-94 ²	D, all compounds except those given for W and Y W, halides Y, oxides and hydroxides-	2E+4 - 6E+4	4E+4 6E+4 2E-5	2E-5 3E-5 8E-8	6E-8 9E-8 -	2E-4 - -	2E-3 - -
44	Ruthenium-97	D, see 94 Ru W, see 94 Ru Y, see 94 Ru	8E+3 - -	2E+4 1E+4 1E+4	8E-6 5E-6 5E-6	3E-8 2E-8 2E-8	1E-4 - -	1E-3 - -

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			Inhalation		Air (μ Ci/ml)	Water (μ Ci/ml)	
44 Ruthenium-103	D, see ^{94}Ru	2E+3	2E+3	7E-7	2E-9	3E-5	3E-4
	W, see ^{94}Ru	-	1E+3	4E-7	1E-9	-	-
	Y, see ^{94}Ru	-	6E+2	3E-7	9E-10	-	-
44 Ruthenium-105	D, see ^{94}Ru	5E+3	1E+4	6E-6	2E-8	7E-5	7E-4
	W, see ^{94}Ru	-	1E+4	6E-6	2E-8	-	-
	Y, see ^{94}Ru	-	1E+4	5E-6	2E-8	-	-
44 Ruthenium-106	D, see ^{94}Ru	2E+2 LLI wall (2E+2)	9E+1	4E-8	1E-10	-	-
	W, see ^{94}Ru	-	5E+1	2E-8	8E-11	-	-
	Y, see ^{94}Ru	-	1E+1	5E-9	2E-11	-	-
45 Rhodium-99m	D, all compounds except those given for W and Y	2E+4	6E+4	2E-5	8E-8	2E-4	2E-3
	W, halides	-	8E+4	3E-5	1E-7	-	-
	Y, oxides and hydroxides-	7E+4	3E-5	9E-8	-	-	-
45 Rhodium-99	D, see $^{99\text{m}}\text{Rh}$	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
	W, see $^{99\text{m}}\text{Rh}$	-	2E+3	9E-7	3E-9	-	-
	Y, see $^{99\text{m}}\text{Rh}$	-	2E+3	8E-7	3E-9	-	-
45 Rhodium-100	D, see $^{99\text{m}}\text{Rh}$	2E+3	5E+3	2E-6	7E-9	2E-5	2E-4
	W, see $^{99\text{m}}\text{Rh}$	-	4E+3	2E-6	6E-9	-	-
	Y, see $^{99\text{m}}\text{Rh}$	-	4E+3	2E-6	5E-9	-	-
45 Rhodium-101m	D, see $^{99\text{m}}\text{Rh}$	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
	W, see $^{99\text{m}}\text{Rh}$	-	8E+3	4E-6	1E-8	-	-
	Y, see $^{99\text{m}}\text{Rh}$	-	8E+3	3E-6	1E-8	-	-
45 Rhodium-101	D, see $^{99\text{m}}\text{Rh}$	2E+3	5E+2	2E-7	7E-10	3E-5	3E-4
	W, see $^{99\text{m}}\text{Rh}$	-	8E+2	3E-7	1E-9	-	-
	Y, see $^{99\text{m}}\text{Rh}$	-	2E+2	6E-8	2E-10	-	-
45 Rhodium-102m	D, see $^{99\text{m}}\text{Rh}$	1E+3 LLI wall (1E+3)	5E+2	2E-7	7E-10	-	-
	W, see $^{99\text{m}}\text{Rh}$	-	4E+2	2E-7	5E-10	2E-5	2E-4
	Y, see $^{99\text{m}}\text{Rh}$	-	1E+2	5E-8	2E-10	-	-
45 Rhodium-102	D, see $^{99\text{m}}\text{Rh}$	6E+2	9E+1	4E-8	1E-10	8E-6	8E-5
	W, see $^{99\text{m}}\text{Rh}$	-	2E+2	7E-8	2E-10	-	-
	Y, see $^{99\text{m}}\text{Rh}$	-	6E+1	2E-8	8E-11	-	-
45 Rhodium-103m ²	D, see $^{99\text{m}}\text{Rh}$	4E+5	1E+6	5E-4	2E-6	6E-3	6E-2
	W, see $^{99\text{m}}\text{Rh}$	-	1E+6	5E-4	2E-6	-	-
	Y, see $^{99\text{m}}\text{Rh}$	-	1E+6	5E-4	2E-6	-	-
45 Rhodium-105	D, see $^{99\text{m}}\text{Rh}$	4E+3 LLI wall (4E+3)	1E+4	5E-6	2E-8	-	-
	W, see $^{99\text{m}}\text{Rh}$	-	6E+3	3E-6	9E-9	5E-5	5E-4
	Y, see $^{99\text{m}}\text{Rh}$	-	6E+3	2E-6	8E-9	-	-
45 Rhodium-106m	D, see $^{99\text{m}}\text{Rh}$	8E+3	3E+4	1E-5	4E-8	1E-4	1E-3
	W, see $^{99\text{m}}\text{Rh}$	-	4E+4	2E-5	5E-8	-	-
	Y, see $^{99\text{m}}\text{Rh}$	-	4E+4	1E-5	5E-8	-	-
45 Rhodium-107 ²	D, see $^{99\text{m}}\text{Rh}$	7E+4 St wall	2E+5	1E-4	3E-7	-	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
		Inhalation					
46	Palladium-100	W, see 99m Rh	(9E+4)	-	-	1E-3	1E-2
		Y, see 99m Rh	-	3E+5	1E-4	-	-
		Y, oxides and hydroxides-	-	3E+5	1E-4	-	-
46	Palladium-101	D, all compounds except those given for W and Y	1E+3	1E+3	6E-7	2E-9	2E-5
		W, nitrates	-	1E+3	5E-7	2E-9	-
		Y, oxides and hydroxides-	1E+3	6E-7	2E-9	-	-
46	Palladium-103	D, see 100 Pd	6E+3	6E+3	3E-6	9E-9	-
		W, see 100 Pd	LLI wall (7E+3)	-	-	-	1E-4
		Y, see 100 Pd	-	4E+3	2E-6	6E-9	-
46	Palladium-107	D, see 100 Pd	3E+4	2E+4	9E-6	-	-
		W, see 100 Pd	LLI wall (4E+4)	(2E+4)	-	3E-8	5E-4
		Y, see 100 Pd	-	7E+3	3E-6	1E-8	-
46	Palladium-109	D, see 100 Pd	2E+3	6E+3	3E-6	9E-9	3E-5
		W, see 100 Pd	-	5E+3	2E-6	8E-9	-
		Y, see 100 Pd	-	5E+3	2E-6	6E-9	-
47	Silver-102 ²	D, all compounds except those given for W and Y	5E+4	2E+5	8E-5	2E-7	-
		W, nitrates and sulfides-	St wall (6E+4)	-	-	-	9E-4
		Y, oxides and hydroxides-	2E+5	9E-5	3E-7	-	9E-3
47	Silver-103 ²	D, see 102 Ag	4E+4	1E+5	4E-5	1E-7	5E-4
		W, see 102 Ag	-	1E+5	5E-5	2E-7	-
		Y, see 102 Ag	-	1E+5	5E-5	2E-7	-
47	Silver-104m ²	D, see 102 Ag	3E+4	9E+4	4E-5	1E-7	4E-4
		W, see 102 Ag	-	1E+5	5E-5	2E-7	-
		Y, see 102 Ag	-	1E+5	5E-5	2E-7	-
47	Silver-104 ²	D, see 102 Ag	2E+4	7E+4	3E-5	1E-7	3E-4
		W, see 102 Ag	-	1E+5	6E-5	2E-7	-
		Y, see 102 Ag	-	1E+5	6E-5	2E-7	-
47	Silver-105	D, see 102 Ag	3E+3	1E+3	4E-7	1E-9	4E-5
		W, see 102 Ag	-	2E+3	7E-7	2E-9	-
		Y, see 102 Ag	-	2E+3	7E-7	2E-9	-
47	Silver-106m	D, see 102 Ag	8E+2	7E+2	3E-7	1E-9	1E-5
		W, see 102 Ag	-	9E+2	4E-7	1E-9	-
		Y, see 102 Ag	-	9E+2	4E-7	1E-9	-
47	Silver-106 ²	D, see 102 Ag	6E+4	2E+5	8E-5	3E-7	-
		W, see 102 Ag	St. wall (6E+4)	-	-	-	9E-4
		Y, see 102 Ag	-	2E+5	9E-5	3E-7	9E-3

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
47	Silver-108m	D, see ^{102}Ag W, see ^{102}Ag Y, see ^{102}Ag	6E+2 - -	2E+2 3E+2 2E+1	8E-8 1E-7 1E-8	3E-10 4E-10 3E-11	9E-6 - -
47	Silver-110m	D, see ^{102}Ag W, see ^{102}Ag Y, see ^{102}Ag	5E+2 - -	1E+2 2E+2 9E+1	5E-8 8E-8 4E-8	2E-10 3E-10 1E-10	6E-6 - -
47	Silver-111	D, see ^{102}Ag W, see ^{102}Ag Y, see ^{102}Ag	9E+2 LLI wall (1E+3) - -	2E+3 Liver (2E+3) 9E+2 9E+2	6E-7 - 4E-7 4E-7	- 2E-9 1E-9 1E-9	- 2E-5 - -
47	Silver-112	D, see ^{102}Ag W, see ^{102}Ag Y, see ^{102}Ag	3E+3 - -	8E+3 1E+4 9E+3	3E-6 4E-6 4E-6	1E-8 1E-8 1E-8	4E-5 - -
47	Silver-115 ²	D, see ^{102}Ag W, see ^{102}Ag Y, see ^{102}Ag	3E+4 St wall (3E+4) - -	9E+4 - 9E+4 8E+4	4E-5 - 4E-5 3E-5	1E-7 - 1E-7 1E-7	- - 4E-4 -
48	Cadmium-104 ²	D, all compounds except those given for W and Y W, sulfides, halides and nitrates Y, oxides and hydroxides-	2E+4 - 1E+5	7E+4 1E+5 5E-5	3E-5 5E-5 2E-7	9E-8 2E-7 -	3E-4 - -
48	Cadmium-107	D, see ^{104}Cd W, see ^{104}Cd Y, see ^{104}Cd	2E+4 - -	5E+4 6E+4 5E+4	2E-5 2E-5 2E-5	8E-8 8E-8 7E-8	3E-4 - -
48	Cadmium-109	D, see ^{104}Cd W, see ^{104}Cd Y, see ^{104}Cd	3E+2 Kidneys (4E+2) - Kidneys (1E+2) - Kidneys (1E+2)	4E+1 Kidneys (5E+1) 1E+2 Kidneys (1E+2) 1E+2	1E-8 - 5E-8 - 2E-10 5E-8	- 7E-11 - 2E-10 2E-10	- 6E-6 - -
48	Cadmium-113m	D, see ^{104}Cd W, see ^{104}Cd Y, see ^{104}Cd	2E+1 Kidneys (4E+1) - Kidneys (1E+1) - Kidneys (1E+1)	2E+0 Kidneys (4E+0) 8E+0 Kidneys (1E+1) 1E+1	1E-9 - 4E-9 - 2E-11 5E-9	- 5E-12 - 2E-11 2E-11	- 5E-7 - -
48	Cadmium-113	D, see ^{104}Cd W, see ^{104}Cd Y, see ^{104}Cd	2E+1 Kidneys (3E+1) - Kidneys (3E+0) - Kidneys (1E+1)	2E+0 Kidneys (3E+0) 8E+0 Kidneys (1E+1) 1E+1	9E-10 - 3E-9 - 2E-11 6E-9	- 5E-12 - 2E-11 2E-11	- 4E-7 - -
48	Cadmium-115m	D, see ^{104}Cd	3E+2 -	5E+1 Kidneys (8E+1)	2E-8 -	- 1E-10	4E-6 -

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
		W, see ^{104}Cd	-	1E+2	5E-8	2E-10	-
48	Cadmium-115	Y, see ^{104}Cd	-	1E+2	6E-8	2E-10	-
		D, see ^{104}Cd	9E+2 LLI wall (1E+3)	1E+3	6E-7	2E-9	-
		W, see ^{104}Cd	-	-	-	-	1E-5
48	Cadmium-117m	Y, see ^{104}Cd	-	1E+3	5E-7	2E-9	-
		D, see ^{104}Cd	5E+3	1E+4	5E-6	2E-8	6E-5
		W, see ^{104}Cd	-	2E+4	7E-6	2E-8	-
48	Cadmium-117	Y, see ^{104}Cd	-	1E+4	6E-6	2E-8	-
		D, see ^{104}Cd	5E+3	1E+4	5E-6	2E-8	6E-5
		W, see ^{104}Cd	-	2E+4	7E-6	2E-8	-
48	Indium-109	Y, see ^{104}Cd	-	1E+4	6E-6	2E-8	-
		D, all compounds except those given for W	2E+4	4E+4	2E-5	6E-8	3E-4
		W, oxides, hydroxides, halides and nitrates	-	6E+4	3E-5	9E-8	-
49	Indium-110 ² (69.1 min)	D, see ^{109}In	2E+4	4E+4	2E-5	6E-8	2E-4
		W, see ^{109}In	-	6E+4	2E-5	8E-8	-
49	Indium-110 (4.9 h)	D, see ^{109}In	5E+3	2E+4	7E-6	2E-8	7E-5
		W, see ^{109}In	-	2E+4	8E-6	3E-8	-
49	Indium-111	D, see ^{109}In	4E+3	6E+3	3E-6	9E-9	6E-5
		W, see ^{109}In	-	6E+3	3E-6	9E-9	-
49	Indium-112 ²	D, see ^{109}In	2E+5	6E+5	3E-4	9E-7	2E-3
		W, see ^{109}In	-	7E+5	3E-4	1E-6	-
49	Indium-113m ²	D, see ^{109}In	5E+4	1E+5	6E-5	2E-7	7E-4
		W, see ^{109}In	-	2E+5	8E-5	3E-7	-
49	Indium-114m	D, see ^{109}In	3E+2 LLI wall (4E+2)	6E+1	3E-8	9E-11	-
		W, see ^{109}In	-	1E+2	4E-8	1E-10	5E-6
49	Indium-115m	D, see ^{109}In	1E+4	4E+4	2E-5	6E-8	2E-4
		W, see ^{109}In	-	5E+4	2E-5	7E-8	-
49	Indium-115	D, see ^{109}In	4E+1	1E+0	6E-10	2E-12	5E-7
		W, see ^{109}In	-	5E+0	2E-9	8E-12	-
49	Indium-116m ²	D, see ^{109}In	2E+4	8E+4	3E-5	1E-7	3E-4
		W, see ^{109}In	-	1E+5	5E-5	2E-7	-
49	Indium-117m ²	D, see ^{109}In	1E+4	3E+4	1E-5	5E-8	2E-4
		W, see ^{109}In	-	4E+4	2E-5	6E-8	-
49	Indium-117 ²	D, see ^{109}In	6E+4	2E+5	7E-5	2E-7	8E-4
		W, see ^{109}In	-	2E+5	9E-5	3E-7	-
49	Indium-119m ²	D, see ^{109}In	4E+4 St wall (5E+4)	1E+5	5E-5	2E-7	-
			-	-	-	-	7E-4

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
	W, see ^{109}In	-	1E+5	6E-5	2E-7	-	-
50 Tin-110	D, all compounds except those given for W	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4
	W, sulfides, oxides, hydroxides, halides, nitrates and stannic phosphate	-	1E+4	5E-6	2E-8	-	-
50 Tin-111 ²	D, see ^{110}Sn	7E+4	2E+5	9E-5	3E-7	1E-3	1E-2
	W, see ^{110}Sn	-	3E+5	1E-4	4E-7	-	-
50 Tin-113	D, see ^{110}Sn	2E+3 LLI wall (2E+3)	1E+3	5E-7	2E-9	-	-
	W, see ^{110}Sn	-	5E+2	2E-7	8E-10	3E-5	3E-4
50 Tin-117m	D, see ^{110}Sn	2E+3 LLI wall (2E+3)	1E+3 Bone surf (2E+3)	5E-7	-	-	-
	W, see ^{110}Sn	-	1E+3	6E-7	3E-9 2E-9	3E-5	3E-4
50 Tin-119m	D, see ^{110}Sn	3E+3 LLI wall (4E+3)	2E+3	1E-6	3E-9	-	-
	W, see ^{110}Sn	-	1E+3	4E-7	1E-9	6E-5	6E-4
50 Tin-121m	D, see ^{110}Sn	3E+3 LLI wall (4E+3)	9E+2	4E-7	1E-9	-	-
	W, see ^{110}Sn	-	5E+2	2E-7	8E-10	5E-5	5E-4
50 Tin-121	D, see ^{110}Sn	6E+3 LLI wall (6E+3)	2E+4	6E-6	2E-8	-	-
	W, see ^{110}Sn	-	1E+4	5E-6	2E-8	8E-5	8E-4
50 Tin-123m ²	D, see ^{110}Sn	5E+4	1E+5	5E-5	2E-7	7E-4	7E-3
	W, see ^{110}Sn	-	1E+5	6E-5	2E-7	-	-
50 Tin-123	D, see ^{110}Sn	5E+2 LLI wall (6E+2)	6E+2	3E-7	9E-10	-	-
	W, see ^{110}Sn	-	2E+2	7E-8	2E-10	9E-6	9E-5
50 Tin-125	D, see ^{110}Sn	4E+2 LLI wall (5E+2)	9E+2	4E-7	1E-9	-	-
	W, see ^{110}Sn	-	4E+2	1E-7	5E-10	6E-6	6E-5
50 Tin-126	D, see ^{110}Sn	3E+2	6E+1	2E-8	8E-11	4E-6	4E-5
	W, see ^{110}Sn	-	7E+1	3E-8	9E-11	-	-
50 Tin-127	D, see ^{110}Sn	7E+3	2E+4	8E-6	3E-8	9E-5	9E-4
	W, see ^{110}Sn	-	2E+4	8E-6	3E-8	-	-
50 Tin-128 ²	D, see ^{110}Sn	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
	W, see ^{110}Sn	-	4E+4	1E-5	5E-8	-	-
51 Antimony-115 ²	D, all compounds except those given for W	8E+4	2E+5	1E-4	3E-7	1E-3	1E-2
	W, oxides, hydroxides,						

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
	halides, sulfides, sulfates and nitrates-	3E+5	1E-4	4E-7	-	-	
51	Antimony-116m ²	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	2E+4 -	7E+4 1E+5	3E-5 6E-5	1E-7 2E-7	3E-4 -
51	Antimony-116 ²	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	7E+4 St wall (9E+4) -	3E+5 -	1E-4 1E-4	4E-7 5E-7	- 1E-3 -
51	Antimony-117	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	7E+4 -	2E+5 3E+5	9E-5 1E-4	3E-7 4E-7	9E-4 -
51	Antimony-118m	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	6E+3 5E+3	2E+4 2E+4	8E-6 9E-6	3E-8 3E-8	7E-5 -
51	Antimony-119	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	2E+4 2E+4	5E+4 3E+4	2E-5 1E-5	6E-8 4E-8	2E-4 -
51	Antimony-120 ² (16 min)	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	1E+5 St wall (2E+5) -	4E+5 -	2E-4 -	6E-7 -	- -
51	Antimony-120 (5.76 d)	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	1E+3 9E+2	2E+3 1E+3	9E-7 5E-7	3E-9 2E-9	1E-5 -
51	Antimony-122	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	8E+2 LLI wall (8E+2) 7E+2	2E+3 -	1E-6 -	3E-9 -	- -
51	Antimony-124m ²	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	3E+5 2E+5	8E+5 6E+5	4E-4 2E-4	1E-6 8E-7	3E-3 -
51	Antimony-124	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	6E+2 5E+2	9E+2 2E+2	4E-7 1E-7	1E-9 3E-10	7E-6 -
51	Antimony-125	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	2E+3 -	2E+3 5E+2	1E-6 2E-7	3E-9 7E-10	3E-5 -
51	Antimony-126m ²	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	5E+4 St wall (7E+4) -	2E+5 -	8E-5 -	3E-7 -	- -
51	Antimony-126	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	6E+2 5E+2	1E+3 5E+2	5E-7 2E-7	2E-9 7E-10	7E-6 -
51	Antimony-127	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	8E+2 LLI wall (8E+2) 7E+2	2E+3 -	9E-7 -	3E-9 -	- -
51	Antimony-128 ² (10.4 min)	D, see ¹¹⁵ Sb W, see ¹¹⁵ Sb	8E+4 St wall (1E+5) -	4E+5 -	2E-4 -	5E-7 -	- -
51	Antimony-128	D, see ¹¹⁵ Sb	1E+3	4E+3	2E-6	6E-9	2E-5

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
(9.01 h)	W, see ^{115}Sb	-	3E+3	1E-6	5E-9	-	-
51	Antimony-129	D, see ^{115}Sb W, see ^{115}Sb	3E+3 -	9E+3 9E+3	4E-6 4E-6	1E-8 1E-8	4E-5 -
51	Antimony-130 ²	D, see ^{115}Sb W, see ^{115}Sb	2E+4 -	6E+4 8E+4	3E-5 3E-5	9E-8 1E-7	3E-4 -
51	Antimony-131 ²	D, see ^{115}Sb	1E+4 Thyroid (2E+4)	2E+4 Thyroid (4E+4)	1E-5 -	-	-
		W, see ^{115}Sb	-	2E+4 Thyroid (4E+4)	1E-5 -	6E-8 6E-8	2E-4 -
52	Tellurium-116	D, all compounds except those given for W W, oxides, hydroxides and nitrates	8E+3 -	2E+4 3E+4	9E-6 1E-5	3E-8 4E-8	1E-4 -
52	Tellurium-121m	D, see ^{116}Te	5E+2 Bone surf (7E+2)	2E+2 Bone surf (4E+2)	8E-8 -	-	-
		W, see ^{116}Te	-	4E+2	2E-7	5E-10 6E-10	1E-5 -
52	Tellurium-121	D, see ^{116}Te W, see ^{116}Te	3E+3 -	4E+3 3E+3	2E-6 1E-6	6E-9 4E-9	4E-5 -
52	Tellurium-123m	D, see ^{116}Te	6E+2 Bone surf (1E+3)	2E+2 Bone surf (5E+2)	9E-8 -	-	-
		W, see ^{116}Te	-	5E+2	2E-7	8E-10 8E-10	1E-5 -
52	Tellurium-123	D, see ^{116}Te	5E+2 Bone surf (1E+3)	2E+2 Bone surf (5E+2)	8E-8 -	-	-
		W, see ^{116}Te	-	4E+2 Bone surf (1E+3)	2E-7 -	7E-10 2E-5	2E-4 -
52	Tellurium-125m	D, see ^{116}Te	1E+3 Bone surf (1E+3)	4E+2 Bone surf (1E+3)	2E-7 -	-	-
		W, see ^{116}Te	-	7E+2	3E-7	1E-9 1E-9	2E-5 -
52	Tellurium-127m	D, see ^{116}Te	6E+2	3E+2 Bone surf	1E-7	-	9E-6
		W, see ^{116}Te	-	(4E+2) 3E+2	-	6E-10 4E-10	9E-5 -
52	Tellurium-127	D, see ^{116}Te W, see ^{116}Te	7E+3 -	2E+4 2E+4	9E-6 7E-6	3E-8 2E-8	1E-4 -
52	Tellurium-129m	D, see ^{116}Te W, see ^{116}Te	5E+2 -	6E+2 2E+2	3E-7 1E-7	9E-10 3E-10	7E-6
52	Tellurium-129 ²	D, see ^{116}Te W, see ^{116}Te	3E+4 -	6E+4 7E+4	3E-5 3E-5	9E-8 1E-7	4E-4 -
52	Tellurium-131m	D, see ^{116}Te	3E+2 Thyroid	4E+2 Thyroid	2E-7	-	-

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2		Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
52 Tellurium-131 ²	D, see ¹¹⁶ Te	(6E+2)	(1E+3) 4E+2 Thyroid (9E+2)	- 2E-7	2E-9	8E-6	8E-5
		-	-	-	-	-	-
		-	-	-	1E-9	-	-
52 Tellurium-132	D, see ¹¹⁶ Te	3E+3 Thyroid (6E+3)	5E+3 Thyroid (1E+4)	2E-6	-	-	-
		-	5E+3 Thyroid (1E+4)	- 2E-6	2E-8	8E-5	8E-4
		-	-	-	2E-8	-	-
52 Tellurium-133m ²	D, see ¹¹⁶ Te	2E+2 Thyroid (7E+2)	2E+2 Thyroid (8E+2)	9E-8	-	-	-
		-	2E+2 Thyroid (6E+2)	- 9E-8	1E-9	9E-6	9E-5
		-	-	-	9E-10	-	-
52 Tellurium-133 ²	D, see ¹¹⁶ Te	3E+3 Thyroid (6E+3)	5E+3 Thyroid (1E+4)	2E-6	-	-	-
		-	5E+3 Thyroid (1E+4)	- 2E-6	2E-8	9E-5	9E-4
		-	-	-	2E-8	-	-
52 Tellurium-134 ²	D, see ¹¹⁶ Te	1E+4 Thyroid (3E+4)	2E+4 Thyroid (6E+4)	9E-6	-	-	-
		-	2E+4 Thyroid (6E+4)	- 9E-6	8E-8	4E-4	4E-3
		-	-	-	8E-8	-	-
53 Iodine-120m ²	D, all compounds	2E+4 Thyroid (2E+4)	2E+4 Thyroid (5E+4)	1E-5	-	-	-
		-	2E+4 Thyroid (5E+4)	- 1E-5	7E-8	3E-4	3E-3
		-	-	-	7E-8	-	-
53 Iodine-120 ²	D, all compounds	1E+4 Thyroid (1E+4)	2E+4	9E-6	3E-8	-	-
		-	-	-	-	2E-4	2E-3
		-	-	-	-	-	-
53 Iodine-121	D, all compounds	4E+3 Thyroid (8E+3)	9E+3 Thyroid (1E+4)	4E-6	-	-	-
		-	-	-	2E-8	1E-4	1E-3
		-	-	-	-	-	-
53 Iodine-123	D, all compounds	1E+4 Thyroid (3E+4)	2E+4 Thyroid (5E+4)	8E-6	-	-	-
		-	-	-	7E-8	4E-4	4E-3
		-	-	-	-	-	-
53 Iodine-124	D, all compounds	3E+3 Thyroid (1E+4)	6E+3 Thyroid (2E+4)	3E-6	-	-	-
		-	-	-	2E-8	1E-4	1E-3
		-	-	-	-	-	-
53 Iodine-125	D, all compounds	5E+1 Thyroid (2E+2)	8E+1 Thyroid (3E+2)	3E-8	-	-	-
		-	-	-	4E-10	2E-6	2E-5
		-	-	-	-	-	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
		Thyroid (1E+2)	Thyroid (2E+2)	-	3E-10	2E-6	2E-5
53	Iodine-126	D, all compounds	2E+1 Thyroid (7E+1)	4E+1 Thyroid (1E+2)	1E-8	-	-
53	Iodine-128 ²	D, all compounds	4E+4 St wall (6E+4)	1E+5	5E-5	2E-7	-
53	Iodine-129	D, all compounds	5E+0 Thyroid (2E+1)	9E+0 Thyroid (3E+1)	4E-9	-	-
53	Iodine-130	D, all compounds	4E+2 Thyroid (1E+3)	7E+2 Thyroid (2E+3)	3E-7	-	-
53	Iodine-131	D, all compounds	3E+1 Thyroid (9E+1)	5E+1 Thyroid (2E+2)	2E-8	-	-
53	Iodine-132m ²	D, all compounds	4E+3 Thyroid (1E+4)	8E+3 Thyroid (2E+4)	4E-6	-	-
53	Iodine-132	D, all compounds	4E+3 Thyroid (9E+3)	8E+3 Thyroid (1E+4)	3E-6	-	-
53	Iodine-133	D, all compounds	1E+2 Thyroid (5E+2)	3E+2 Thyroid (9E+2)	1E-7	-	-
53	Iodine-134 ²	D, all compounds	2E+4 Thyroid (3E+4)	5E+4	2E-5	6E-8	-
53	Iodine-135	D, all compounds	8E+2 Thyroid (3E+3)	2E+3 Thyroid (4E+3)	7E-7	-	-
54	Xenon-120 ²	Submersion ¹	-	-	1E-5	4E-8	-
54	Xenon-121 ²	Submersion ¹	-	-	2E-6	1E-8	-
54	Xenon-122	Submersion ¹	-	-	7E-5	3E-7	-
54	Xenon-123	Submersion ¹	-	-	6E-6	3E-8	-
54	Xenon-125	Submersion ¹	-	-	2E-5	7E-8	-
54	Xenon-127	Submersion ¹	-	-	1E-5	6E-8	-
54	Xenon-129m	Submersion ¹	-	-	2E-4	9E-7	-
54	Xenon-131m	Submersion ¹	-	-	4E-4	2E-6	-
54	Xenon-133m	Submersion ¹	-	-	1E-4	6E-7	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
54	Xenon-133	Submersion ¹	-	-	1E-4	5E-7	-
54	Xenon-135m ²	Submersion ¹	-	-	9E-6	4E-8	-
54	Xenon-135	Submersion ¹	-	-	1E-5	7E-8	-
54	Xenon-138 ²	Submersion ¹	-	-	4E-6	2E-8	-
55	Cesium-125 ²	D, all compounds	5E+4 St wall (9E+4)	1E+5	6E-5	2E-7	-
55	Cesium-127	D, all compounds	6E+4	9E+4	4E-5	1E-7	9E-4
55	Cesium-129	D, all compounds	2E+4	3E+4	1E-5	5E-8	3E-4
55	Cesium-130 ²	D, all compounds	6E+4 St wall (1E+5)	2E+5	8E-5	3E-7	-
55	Cesium-131	D, all compounds	2E+4	3E+4	1E-5	4E-8	3E-4
55	Cesium-132	D, all compounds	3E+3	4E+3	2E-6	6E-9	4E-5
55	Cesium-134m	D, all compounds	1E+5 St wall (1E+5)	1E+5	6E-5	2E-7	-
55	Cesium-134	D, all compounds	7E+1	1E+2	4E-8	2E-10	9E-7
55	Cesium-135m ²	D, all compounds	1E+5	2E+5	8E-5	3E-7	1E-3
55	Cesium-135	D, all compounds	7E+2	1E+3	5E-7	2E-9	1E-5
55	Cesium-136	D, all compounds	4E+2	7E+2	3E-7	9E-10	6E-6
55	Cesium-137	D, all compounds	1E+2	2E+2	6E-8	2E-10	1E-6
55	Cesium-138 ²	D, all compounds	2E+4 St wall (3E+4)	6E+4	2E-5	8E-8	-
56	Barium-126 ²	D, all compounds	6E+3	2E+4	6E-6	2E-8	8E-5
56	Barium-128	D, all compounds	5E+2	2E+3	7E-7	2E-9	7E-6
56	Barium-131m ²	D, all compounds	4E+5 St wall (5E+5)	1E+6	6E-4	2E-6	-
56	Barium-131	D, all compounds	3E+3	8E+3	3E-6	1E-8	4E-5
56	Barium-133m	D, all compounds	2E+3 LLI wall (3E+3)	9E+3	4E-6	1E-8	-
56	Barium-133	D, all compounds	2E+3	7E+2	3E-7	9E-10	2E-5
56	Barium-135m	D, all compounds	3E+3	1E+4	5E-6	2E-8	4E-5
56	Barium-139 ²	D, all compounds	1E+4	3E+4	1E-5	4E-8	2E-4

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
56	Barium-140	D, all compounds	5E+2 LLI wall (6E+2)	1E+3	6E-7	2E-9	-
				-	-	-	8E-6
56	Barium-141 ²	D, all compounds	2E+4	7E+4	3E-5	1E-7	3E-4
56	Barium-142 ²	D, all compounds	5E+4	1E+5	6E-5	2E-7	7E-4
57	Lanthanum-131 ²	D, all compounds except those given for W W, oxides and hydroxides-	5E+4 2E+5	1E+5 7E-5	5E-5 2E-7	2E-7	6E-4
					-	-	6E-3
57	Lanthanum-132	D, see ¹³¹ La W, see ¹³¹ La	3E+3 -	1E+4 1E+4	4E-6 5E-6	1E-8 2E-8	4E-5
57	Lanthanum-135	D, see ¹³¹ La W, see ¹³¹ La	4E+4 -	1E+5 9E+4	4E-5 4E-5	1E-7 1E-7	5E-4
57	Lanthanum-137	D, see ¹³¹ La W, see ¹³¹ La	1E+4 -	6E+1 (7E+1) 3E+2	3E-8 - 1E-7	- 1E-10 -	2E-4
							2E-3
57	Lanthanum-138	D, see ¹³¹ La W, see ¹³¹ La	9E+2 -	4E+0 1E+1	1E-9 6E-9	5E-12 2E-11	1E-5
57	Lanthanum-140	D, see ¹³¹ La W, see ¹³¹ La	6E+2 -	1E+3 1E+3	6E-7 5E-7	2E-9 2E-9	9E-6
57	Lanthanum-141	D, see ¹³¹ La W, see ¹³¹ La	4E+3 -	9E+3 1E+4	4E-6 5E-6	1E-8 2E-8	5E-5
57	Lanthanum-142 ²	D, see ¹³¹ La W, see ¹³¹ La	8E+3 -	2E+4 3E+4	9E-6 1E-5	3E-8 5E-8	1E-4
57	Lanthanum-143 ²	D, see ¹³¹ La W, see ¹³¹ La	4E+4 -	1E+5 9E+4	4E-5 4E-5	1E-7 1E-7	-
							5E-4
58	Cerium-134	W, all compounds except those given for Y Y, oxides, hydroxides and fluorides	5E+2 LLI wall (6E+2) -	7E+2 - 7E+2	3E-7 - 3E-7	1E-9 - 9E-10	-
							8E-6
58	Cerium-135	W, see ¹³⁴ Ce Y, see ¹³⁴ Ce	2E+3 -	4E+3 4E+3	2E-6 1E-6	5E-9 5E-9	2E-5
58	Cerium-137m	W, see ¹³⁴ Ce Y, see ¹³⁴ Ce	2E+3 LLI wall (2E+3) -	4E+3 4E+3	2E-6 2E-6	6E-9 5E-9	-
58	Cerium-137	W, see ¹³⁴ Ce Y, see ¹³⁴ Ce	5E+4 -	1E+5 1E+5	6E-5 5E-5	2E-7 2E-7	7E-4
							-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
58	Cerium-139	W, see ^{134}Ce Y, see ^{134}Ce	5E+3 -	8E+2 7E+2	3E-7 3E-7	1E-9 9E-10	7E-5 -
58	Cerium-141	W, see ^{134}Ce	2E+3 LLI wall (2E+3)	7E+2	3E-7	1E-9	-
		Y, see ^{134}Ce	-	6E+2	2E-7	8E-10	3E-5 3E-4
58	Cerium-143	W, see ^{134}Ce	1E+3 LLI wall (1E+3)	2E+3	8E-7	3E-9	-
		Y, see ^{134}Ce	-	2E+3	7E-7	2E-9	2E-5 2E-4
58	Cerium-144	W, see ^{134}Ce	2E+2 LLI wall (3E+2)	3E+1	1E-8	4E-11	-
		Y, see ^{134}Ce	-	1E+1	6E-9	2E-11	3E-6 3E-5
59	Praseodymium-136 ²	W, all compounds except those given for Y	5E+4 St wall (7E+4)	2E+5	1E-4	3E-7	-
		Y, oxides, hydroxides, carbides and fluorides	-	2E+5	9E-5	3E-7	1E-3 1E-2
59	Praseodymium-137 ²	W, see ^{136}Pr Y, see ^{136}Pr	4E+4 -	2E+5 1E+5	6E-5 6E-5	2E-7 2E-7	5E-4 -
		W, see ^{136}Pr Y, see ^{136}Pr	1E+4 -	5E+4 4E+4	2E-5 2E-5	8E-8 6E-8	1E-4 -
59	Praseodymium-139	W, see ^{136}Pr Y, see ^{136}Pr	4E+4 -	1E+5 1E+5	5E-5 5E-5	2E-7 2E-7	6E-4 -
		W, see ^{136}Pr Y, see ^{136}Pr	8E+4 -	2E+5 1E+5	7E-5 6E-5	2E-7 2E-7	1E-3 -
59	Praseodymium-142m ²	W, see ^{136}Pr Y, see ^{136}Pr	1E+3 -	2E+3 2E+3	9E-7 8E-7	3E-9 3E-9	1E-5 -
		W, see ^{136}Pr Y, see ^{136}Pr	9E+2 LLI wall (1E+3)	8E+2 7E+2	3E-7 3E-7	1E-9 9E-10	-
59	Praseodymium-143	W, see ^{136}Pr	3E+4 St wall (4E+4)	1E+5	5E-5	2E-7	-
		Y, see ^{136}Pr	-	1E+5	5E-5	2E-7	6E-4 -
59	Praseodymium-144 ²	W, see ^{136}Pr	3E+3 St wall (4E+4)	9E+3 8E+3	4E-6 3E-6	1E-8 1E-8	4E-5 -
		Y, see ^{136}Pr	-	1E+5	5E-5	2E-7	6E-4 -
59	Praseodymium-145	W, see ^{136}Pr Y, see ^{136}Pr	5E+4 St wall (8E+4)	2E+5	8E-5	3E-7	-
		Y, see ^{136}Pr	-	2E+5	8E-5	3E-7	1E-3 -
60	Neodymium-136 ²	W, all compounds except those given for Y Y, oxides, hydroxides,	1E+4	6E+4	2E-5	8E-8	2E-4 2E-3

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
	carbides and fluorides-	5E+4	2E-5	8E-8	-	-	
60	Neodymium-138	W, see ^{136}Nd Y, see ^{136}Nd	2E+3 -	6E+3 5E+3	3E-6 2E-6	9E-9 7E-9	3E-5 -
60	Neodymium-139m	W, see ^{136}Nd Y, see ^{136}Nd	5E+3 -	2E+4 1E+4	7E-6 6E-6	2E-8 2E-8	7E-5 -
60	Neodymium-139 ²	W, see ^{136}Nd Y, see ^{136}Nd	9E+4 -	3E+5 3E+5	1E-4 1E-4	5E-7 4E-7	1E-3 -
60	Neodymium-141	W, see ^{136}Nd Y, see ^{136}Nd	2E+5 -	7E+5 6E+5	3E-4 3E-4	1E-6 9E-7	2E-3 -
60	Neodymium-147	W, see ^{136}Nd Y, see ^{136}Nd	1E+3 LLI wall (1E+3) -	9E+2 8E+2	4E-7 4E-7	1E-9 1E-9	- 2E-5 -
60	Neodymium-149 ²	W, see ^{136}Nd Y, see ^{136}Nd	1E+4 -	3E+4 2E+4	1E-5 1E-5	4E-8 3E-8	1E-4 -
60	Neodymium-151 ²	W, see ^{136}Nd Y, see ^{136}Nd	7E+4 -	2E+5 2E+5	8E-5 8E-5	3E-7 3E-7	9E-4 -
61	Promethium-141 ²	W, all compounds except those given for Y	5E+4 St wall (6E+4)	2E+5 -	8E-5 -	3E-7 -	- 8E-4 8E-3
		Y, oxides, hydroxides, carbides and fluorides-	2E+5	7E-5	2E-7	-	-
61	Promethium-143	W, see ^{141}Pm Y, see ^{141}Pm	5E+3 -	6E+2 7E+2	2E-7 3E-7	8E-10 1E-9	7E-5 -
61	Promethium-144	W, see ^{141}Pm Y, see ^{141}Pm	1E+3 -	1E+2 1E+2	5E-8 5E-8	2E-10 2E-10	2E-5 -
61	Promethium-145	W, see ^{141}Pm Y, see ^{141}Pm	1E+4 -	2E+2 (2E+2) 2E+2	7E-8 -	- 3E-10 3E-10	1E-4 -
61	Promethium-146	W, see ^{141}Pm Y, see ^{141}Pm	2E+3 -	5E+1 4E+1	2E-8 2E-8	7E-11 6E-11	2E-5 -
61	Promethium-147	W, see ^{141}Pm Y, see ^{141}Pm	4E+3 -	1E+2 (2E+2) 1E+2	5E-8 -	- 3E-10 2E-10	- 7E-5 -
61	Promethium-148m	W, see ^{141}Pm Y, see ^{141}Pm	7E+2 -	3E+2 3E+2	1E-7 1E-7	4E-10 5E-10	1E-5 -
61	Promethium-148	W, see ^{141}Pm Y, see ^{141}Pm	4E+2 -	5E+2 5E+2	2E-7 2E-7	8E-10 7E-10	- 7E-6
61	Promethium-149	W, see ^{141}Pm	1E+3 LLI wall	2E+3	8E-7	3E-9	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
	Y, see ^{141}Pm	(1E+3) -	- 2E+3	- 8E-7	- 2E-9	2E-5 -	2E-4 -
61	Promethium-150	W, see ^{141}Pm Y, see ^{141}Pm	5E+3 -	2E+4 2E+4	8E-6 7E-6	3E-8 2E-8	7E-5 -
61	Promethium-151	W, see ^{141}Pm Y, see ^{141}Pm	2E+3 -	4E+3 3E+3	1E-6 1E-6	5E-9 4E-9	2E-5 -
62	Samarium-141m ²	W, all compounds	3E+4	1E+5	4E-5	1E-7	4E-4
62	Samarium-141 ²	W, all compounds	5E+4 St wall (6E+4)	2E+5	8E-5	2E-7	-
62	Samarium-142 ²	W, all compounds	8E+3	3E+4	1E-5	4E-8	1E-4
62	Samarium-145	W, all compounds	6E+3	5E+2	2E-7	7E-10	8E-5
62	Samarium-146	W, all compounds	1E+1 Bone surf (3E+1)	4E2 Bone surf (6E-2)	1E-11	-	-
62	Samarium-147	W, all compounds	2E+1 Bone surf (3E+1)	4E2 Bone surf (7E-2)	2E-11	-	-
62	Samarium-151	W, all compounds	1E+4 LLI wall (1E+4)	1E+2 Bone surf (2E+2)	4E-8	-	-
62	Samarium-153	W, all compounds	2E+3 LLI wall (2E+3)	3E+3	1E-6	4E-9	-
62	Samarium-155 ²	W, all compounds	6E+4 St wall (8E+4)	2E+5	9E-5	3E-7	-
62	Samarium-156	W, all compounds	5E+3	9E+3	4E-6	1E-8	7E-5
63	Europium-145	W, all compounds	2E+3	2E+3	8E-7	3E-9	2E-5
63	Europium-146	W, all compounds	1E+3	1E+3	5E-7	2E-9	1E-5
63	Europium-147	W, all compounds	3E+3	2E+3	7E-7	2E-9	4E-5
63	Europium-148	W, all compounds	1E+3	4E+2	1E-7	5E-10	1E-5
63	Europium-149	W, all compounds	1E+4	3E+3	1E-6	4E-9	2E-4
63	Europium-150 (12.62 h)	W, all compounds	3E+3	8E+3	4E-6	1E-8	4E-5
63	Europium-150 (34.2 y)	W, all compounds	8E+2	2E+1	8E-9	3E-11	1E-5
63	Europium-152m	W, all compounds	3E+3	6E+3	3E-6	9E-9	4E-5
63	Europium-152	W, all compounds	8E+2	2E+1	1E-8	3E-11	1E-5

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers	
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)	
					Air (μ Ci/ml)	Water (μ Ci/ml)		
63	Europium-154	W, all compounds	5E+2	2E+1	8E-9	3E-11	7E-6	7E-5
63	Europium-155	W, all compounds	4E+3	9E+1 Bone surf (1E+2)	4E-8	-	5E-5	5E-4
			-	-	2E-10	-	-	-
63	Europium-156	W, all compounds	6E+2	5E+2	2E-7	6E-10	8E-6	8E-5
63	Europium-157	W, all compounds	2E+3	5E+3	2E-6	7E-9	3E-5	3E-4
63	Europium-158 ²	W, all compounds	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
64	Gadolinium-145 ²	D, all compounds except those given for W	5E+4 St wall (5E+4)	2E+5	6E-5	2E-7	-	-
		W, oxides, hydroxides and fluorides	-	2E+5	7E-5	2E-7	-	-
64	Gadolinium-146	D, see ¹⁴⁵ Gd W, see ¹⁴⁵ Gd	1E+3 -	1E+2 3E+2	5E-8 1E-7	2E-10 4E-10	2E-5 -	2E-4 -
64	Gadolinium-147	D, see ¹⁴⁵ Gd W, see ¹⁴⁵ Gd	2E+3 -	4E+3 4E+3	2E-6 1E-6	6E-9 5E-9	3E-5 -	3E-4 -
64	Gadolinium-148	D, see ¹⁴⁵ Gd	1E+1 Bone surf (2E+1)	8E+3 Bone surf (2E+2)	3E-12	-	-	-
		W, see ¹⁴⁵ Gd	-	3E-2 Bone surf (6E-2)	1E-11	2E-14	3E-7	3E-6
			-	-	8E-14	-	-	-
64	Gadolinium-149	D, see ¹⁴⁵ Gd W, see ¹⁴⁵ Gd	3E+3 -	2E+3 2E+3	9E-7 1E-6	3E-9 3E-9	4E-5 -	4E-4 -
64	Gadolinium-151	D, see ¹⁴⁵ Gd	6E+3	4E+2 Bone surf (6E+2)	2E-7	-	9E-5	9E-4
		W, see ¹⁴⁵ Gd	-	1E+3 5E-7	-	9E-10 2E-9	-	-
64	Gadolinium-152	D, see ¹⁴⁵ Gd	2E+1 Bone surf (3E+1)	1E-2 Bone surf (2E-2)	4E-12	-	-	-
		W, see ¹⁴⁵ Gd	-	4E-2 Bone surf (8E-2)	2E-11	3E-14	4E-7	4E-6
			-	-	1E-13	-	-	-
64	Gadolinium-153	D, see ¹⁴⁵ Gd	5E+3	1E+2 Bone surf (2E+2)	6E-8	-	6E-5	6E-4
		W, see ¹⁴⁵ Gd	-	6E+2	2E-7	3E-10 8E-10	-	-
64	Gadolinium-159	D, see ¹⁴⁵ Gd W, see ¹⁴⁵ Gd	3E+3	8E+3 6E+3	3E-6 2E-6	1E-8 8E-9	4E-5 -	4E-4 -
65	Terbium-147 ²	W, all compounds	9E+3	3E+4	1E-5	5E-8	1E-4	1E-3
65	Terbium-149	W, all compounds	5E+3	7E+2	3E-7	1E-9	7E-5	7E-4
65	Terbium-150	W, all compounds	5E+3	2E+4	9E-6	3E-8	7E-5	7E-4

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers	
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)	
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)				
65	Terbium-151	W, all compounds	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
65	Terbium-153	W, all compounds	5E+3	7E+3	3E-6	1E-8	7E-5	7E-4
65	Terbium-154	W, all compounds	2E+3	4E+3	2E-6	6E-9	2E-5	2E-4
65	Terbium-155	W, all compounds	6E+3	8E+3	3E-6	1E-8	8E-5	8E-4
65	Terbium-156m (5.0 h)	W, all compounds	2E+4	3E+4	1E-5	4E-8	2E-4	2E-3
65	Terbium-156m (24.4 h)	W, all compounds	7E+3	8E+3	3E-6	1E-8	1E-4	1E-3
65	Terbium-156	W, all compounds	1E+3	1E+3	6E-7	2E-9	1E-5	1E-4
65	Terbium-157	W, all compounds	5E+4 LLI wall (5E+4)	3E+2 Bone surf (6E+2)	1E-7	-	7E-4	7E-3
65	Terbium-158	W, all compounds	1E+3	2E+1	8E-9	3E-11	2E-5	2E-4
65	Terbium-160	W, all compounds	8E+2	2E+2	9E-8	3E-10	1E-5	1E-4
65	Terbium-161	W, all compounds	2E+3 LLI wall (2E+3)	2E+3	7E-7	2E-9	-	-
66	Dysprosium-155	W, all compounds	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
66	Dysprosium-157	W, all compounds	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
66	Dysprosium-159	W, all compounds	1E+4	2E+3	1E-6	3E-9	2E-4	2E-3
66	Dysprosium-165	W, all compounds	1E+4	5E+4	2E-5	6E-8	2E-4	2E-3
66	Dysprosium-166	W, all compounds	6E+2 LLI wall (8E+2)	7E+2	3E-7	1E-9	-	-
67	Holmium-155 ²	W, all compounds	4E+4	2E+5	6E-5	2E-7	6E-4	6E-3
67	Holmium-157 ²	W, all compounds	3E+5	1E+6	6E-4	2E-6	4E-3	4E-2
67	Holmium-159 ²	W, all compounds	2E+5	1E+6	4E-4	1E-6	3E-3	3E-2
67	Holmium-161	W, all compounds	1E+5	4E+5	2E-4	6E-7	1E-3	1E-2
67	Holmium-162m ²	W, all compounds	5E+4	3E+5	1E-4	4E-7	7E-4	7E-3
67	Holmium-162 ²	W, all compounds	5E+5 St wall (8E+5)	2E+6	1E-3	3E-6	-	-
67	Holmium-164m ²	W, all compounds	1E+5	3E+5	1E-4	4E-7	1E-3	1E-2
67	Holmium-164 ²	W, all compounds	2E+5 St wall (2E+5)	6E+5	3E-4	9E-7	-	-
67	Holmium-166m	W, all compounds	6E+2	7E+0	3E-9	9E-12	9E-6	9E-5

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
67	Holmium-166	W, all compounds	9E+2 LLI wall (9E+2)	2E+3	7E-7	2E-9	-
			-	-	-	1E-5	1E-4
67	Holmium-167	W, all compounds	2E+4	6E+4	2E-5	8E-8	2E-4
68	Erbium-161	W, all compounds	2E+4	6E+4	3E-5	9E-8	2E-4
68	Erbium-165	W, all compounds	6E+4	2E+5	8E-5	3E-7	9E-4
68	Erbium-169	W, all compounds	3E+3 LLI wall (4E+3)	3E+3	1E-6	4E-9	-
			-	-	-	5E-5	5E-4
68	Erbium-171	W, all compounds	4E+3	1E+4	4E-6	1E-8	5E-5
68	Erbium-172	W, all compounds	1E+3 LLI wall (E+3)	1E+3	6E-7	2E-9	-
			-	-	-	2E-5	2E-4
69	Thulium-162 ²	W, all compounds	7E+4 St wall (7E+4)	3E+5	1E-4	4E-7	-
			-	-	-	1E-3	1E-2
69	Thulium-166	W, all compounds	4E+3	1E+4	6E-6	2E-8	6E-5
69	Thulium-167	W, all compounds	2E+3	2E+3	8E-7	3E-9	-
			LLI wall (2E+3)	-	-	-	3E-5
69	Thulium-170	W, all compounds	8E+2 LLI wall (1E+3)	2E+2	9E-8	3E-10	-
			-	-	-	1E-5	1E-4
69	Thulium-171	W, all compounds	1E+4 LLI wall (1E+4)	3E+2 Bone surf (6E+2)	1E-7	-	-
			-	-	8E-10	2E-4	2E-3
69	Thulium-172	W, all compounds	7E+2 LLI wall (8E+2)	1E+3	5E-7	2E-9	-
			-	-	-	1E-5	1E-4
69	Thulium-173	W, all compounds	4E+3	1E+4	5E-6	2E-8	6E-5
69	Thulium-175 ²	W, all compounds	7E+4 St wall (9E+4)	3E+5	1E-4	4E-7	-
			-	-	-	1E-3	1E-2
70	Ytterbium-162 ²	W, all compounds except those given for Y, oxides, hydroxides and fluorides	7E+4	3E+5	1E-4	4E-7	1E-3
			-	3E+5	1E-4	4E-7	-
70	Ytterbium-166	W, see ¹⁶² Yb Y, see ¹⁶² Yb	1E+3	2E+3	8E-7	3E-9	2E-5
			-	2E+3	8E-7	3E-9	-
70	Ytterbium-167 ²	W, see ¹⁶² Yb Y, see ¹⁶² Yb	3E+5	8E+5	3E-4	1E-6	4E-3
			-	7E+5	3E-4	1E-6	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
70	Ytterbium-169	W, see ^{162}Yb Y, see ^{162}Yb	2E+3 -	8E+2 7E+2	4E-7 3E-7	1E-9 1E-9	2E-5 -
70	Ytterbium-175	W, see ^{162}Yb	3E+3 LLI wall (3E+3)	4E+3 -	1E-6 -	5E-9 -	- -
		Y, see ^{162}Yb	- 3E+3	- 1E-6	- 5E-9	- -	4E-5 4E-4
70	Ytterbium-177 ²	W, see ^{162}Yb Y, see ^{162}Yb	2E+4 -	5E+4 5E+4	2E-5 2E-5	7E-8 6E-8	2E-4 -
70	Ytterbium-178 ²	W, see ^{162}Yb Y, see ^{162}Yb	1E+4 -	4E+4 4E+4	2E-5 2E-5	6E-8 5E-8	2E-4 -
71	Lutetium-169	W, all compounds except those given for Y	3E+3	4E+3	2E-6	6E-9	3E-5
		Y, oxides, hydroxides, and fluorides	-	4E+3	2E-6	6E-9	- -
71	Lutetium-170	W, see ^{169}Lu Y, see ^{169}Lu	1E+3 -	2E+3 2E+3	9E-7 8E-7	3E-9 3E-9	2E-5 -
71	Lutetium-171	W, see ^{169}Lu Y, see ^{169}Lu	2E+3 -	2E+3 2E+3	8E-7 8E-7	3E-9 3E-9	3E-5 -
71	Lutetium-172	W, see ^{169}Lu Y, see ^{169}Lu	1E+3 -	1E+3 1E+3	5E-7 5E-7	2E-9 2E-9	1E-5 -
71	Lutetium-173	W, see ^{169}Lu	5E+3	3E+2 Bone surf	1E-7	-	7E-5
		Y, see ^{169}Lu	-	(5E+2) 3E+2	- 1E-7	6E-10 4E-10	- -
71	Lutetium-174m	W, see ^{169}Lu	2E+3 LLI wall (3E+3)	2E+2 Bone surf (3E+2)	1E-7 -	- -	- -
		Y, see ^{169}Lu	-	2E+2 9E-8	- 9E-8	5E-10 3E-10	4E-5 -
71	Lutetium-174	W, see ^{169}Lu	5E+3 -	1E+2 Bone surf (2E+2)	5E-8 -	-	7E-5
		Y, see ^{169}Lu	-	2E+2 6E-8	- 6E-8	3E-10 2E-10	- -
71	Lutetium-176m	W, see ^{169}Lu Y, see ^{169}Lu	8E+3 -	3E+4 2E+4	1E-5 9E-6	3E-8 3E-8	1E-4 -
71	Lutetium-176	W, see ^{169}Lu	7E+2	5E+0 Bone surf (1E+1)	2E-9 -	-	1E-5
		Y, see ^{169}Lu	-	8E+0 3E-9	- 1E-11	2E-11 -	- -
71	Lutetium-177m	W, see ^{169}Lu	7E+2	1E+2 Bone surf (1E+2)	5E-8 -	-	1E-5
		Y, see ^{169}Lu	-	8E+1 3E-8	- 1E-10	2E-10 -	- -
71	Lutetium-177	W, see ^{169}Lu	2E+3 LLI wall (3E+3)	2E+3 -	9E-7 -	3E-9 -	- -
		Y, see ^{169}Lu	-	2E+3 9E-7	- 9E-7	- 3E-9	4E-5 -
71	Lutetium-178m ²	W, see ^{169}Lu	5E+4	2E+5	8E-5	3E-7	- -

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2		Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
71 Lutetium-178 ²	W, see ¹⁶⁹ Lu	St. wall (6E+4)	-	-	-	8E-4	8E-3
		-	2E+5	7E-5	2E-7	-	-
71 Lutetium-179	W, see ¹⁶⁹ Lu Y, see ¹⁶⁹ Lu	4E+4 St wall (4E+4)	1E+5	5E-5	2E-7	-	-
		-	1E+5	5E-5	2E-7	-	-
72 Hafnium-170	D, all compounds except those given for W W, oxides, hydroxides, carbides and nitrates-	6E+3	2E+4	8E-6	3E-8	9E-5	9E-4
		-	2E+4	6E-6	3E-8	-	-
72 Hafnium-172	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	3E+3	6E+3	2E-6	8E-9	4E-5	4E-4
		5E+3	2E-6	6E-9	-	-	-
		1E+3	9E+0 Bone surf (2E+1)	4E-9	-	2E-5	2E-4
72 Hafnium-173	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	-	4E+1 Bone surf (6E+1)	-	3E-11	-	-
		-	2E-8	-	-	-	-
72 Hafnium-175	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	5E+3	1E+4 Bone surf (1E+3)	5E-6	2E-8	7E-5	7E-4
		-	1E+4 1E+3	5E-6 5E-7	2E-8 2E-9	-	-
72 Hafnium-177m ²	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
		-	9E+4	4E-5	1E-7	-	-
72 Hafnium-178m	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	3E+2	1E+0 Bone surf (2E+0)	5E-10	-	3E-6	3E-5
		-	5E+0 Bone surf (9E+0)	-	3E-12 - 1E-11	-	-
		-	2E-9	-	-	-	-
72 Hafnium-179m	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	1E+3	3E+2 Bone surf (6E+2)	1E-7	-	1E-5	1E-4
		-	6E+2 3E-7	-	8E-10 8E-10	-	-
72 Hafnium-180m	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
		-	3E+4	1E-5	4E-8	-	-
72 Hafnium-181	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	1E+3	2E+2 Bone surf (4E+2)	7E-8	-	2E-5	2E-4
		-	4E+2 2E-7	-	6E-10 6E-10	-	-
72 Hafnium-182m ²	D, see ¹⁷⁰ Hf W, see ¹⁷⁰ Hf	4E+4	9E+4	4E-5	1E-7	5E-4	5E-3
		-	1E+5	6E-5	2E-7	-	-
72 Hafnium-182	D, see ¹⁷⁰ Hf	2E+2 (4E+2)	8E-1 Bone surf (2E+0)	3E-10	-	-	-
		-	-	-	2E-12	5E-6	5E-5

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
	W, see ^{170}Hf	-	3E+0 Bone surf (7E+0)	1E-9 -	-	-	-
		-	(7E+0)	-	1E-11	-	-
72	Hafnium-183 ²	D, see ^{170}Hf W, see ^{170}Hf	2E+4 -	5E+4 6E+4	2E-5 2E-5	6E-8 8E-8	3E-4 -
72	Hafnium-184	D, see ^{170}Hf W, see ^{170}Hf	2E+3 -	8E+3 6E+3	3E-6 3E-6	1E-8 9E-9	3E-5 -
73	Tantalum-172 ²	W, all compounds except those given for Y Y, elemental Ta, oxides, hydroxides, halides, carbides, nitrates and nitrides	4E+4 -	1E+5 1E+5	5E-5 4E-5	2E-7 1E-7	5E-4 -
73	Tantalum-173	W, see ^{172}Ta Y, see ^{172}Ta	7E+3 -	2E+4 2E+4	8E-6 7E-6	3E-8 2E-8	9E-5 -
73	Tantalum-174 ²	W, see ^{172}Ta Y, see ^{172}Ta	3E+4 -	1E+5 9E+4	4E-5 4E-5	1E-7 1E-7	4E-4 -
73	Tantalum-175	W, see ^{172}Ta Y, see ^{172}Ta	6E+3 -	2E+4 1E+4	7E-6 6E-6	2E-8 2E-8	8E-5 -
73	Tantalum-176	W, see ^{172}Ta Y, see ^{172}Ta	4E+3 -	1E+4 1E+4	5E-6 5E-6	2E-8 2E-8	5E-5 -
73	Tantalum-177	W, see ^{172}Ta Y, see ^{172}Ta	1E+4 -	2E+4 2E+4	8E-6 7E-6	3E-8 2E-8	2E-4 -
73	Tantalum-178	W, see ^{172}Ta Y, see ^{172}Ta	2E+4 -	9E+4 7E+4	4E-5 3E-5	1E-7 1E-7	2E-4 -
73	Tantalum-179	W, see ^{172}Ta Y, see ^{172}Ta	2E+4 -	5E+3 9E+2	2E-6 4E-7	8E-9 1E-9	3E-4 -
73	Tantalum-180m	W, see ^{172}Ta Y, see ^{172}Ta	2E+4 -	7E+4 6E+4	3E-5 2E-5	9E-8 8E-8	3E-4 -
73	Tantalum-180	W, see ^{172}Ta Y, see ^{172}Ta	1E+3 -	4E+2 2E+1	2E-7 1E-8	6E-10 3E-11	2E-5 -
73	Tantalum-182m ²	W, see ^{172}Ta	2E+5 St wall (2E+5)	5E+5 -	2E-4 -	8E-7 -	-
		Y, see ^{172}Ta	-	4E+5 -	2E-4 6E-7	- -	3E-3 -
73	Tantalum-182	W, see ^{172}Ta Y, see ^{172}Ta	8E+2 -	3E+2 1E+2	1E-7 6E-8	5E-10 2E-10	1E-5 -
73	Tantalum-183	W, see ^{172}Ta	9E+2 LLI wall (1E+3)	1E+3 -	5E-7 -	2E-9 -	-
		Y, see ^{172}Ta	-	1E+3 4E-7	- 1E-9	2E-5 -	2E-4 -
73	Tantalum-184	W, see ^{172}Ta Y, see ^{172}Ta	2E+3 -	5E+3 5E+3	2E-6 2E-6	8E-9 7E-9	3E-5 -
73	Tantalum-185 ²	W, see ^{172}Ta Y, see ^{172}Ta	3E+4 -	7E+4 6E+4	3E-5 3E-5	1E-7 9E-8	4E-4 -

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
73	Tantalum-186 ²	W, see ¹⁷² Ta	5E+4 St wall (7E+4)	2E+5	1E-4	3E-7	-
		Y, see ¹⁷² Ta	-	2E+5	9E-5	3E-7	1E-3 1E-2
74	Tungsten-176	D, all compounds	1E+4	5E+4	2E-5	7E-8	1E-4 1E-3
74	Tungsten-177	D, all compounds	2E+4	9E+4	4E-5	1E-7	3E-4 3E-3
74	Tungsten-178	D, all compounds	5E+3	2E+4	8E-6	3E-8	7E-5 7E-4
74	Tungsten-179 ²	D, all compounds	5E+5	2E+6	7E-4	2E-6	7E-3 7E-2
74	Tungsten-181	D, all compounds	2E+4	3E+4	1E-5	5E-8	2E-4 2E-3
74	Tungsten-185	D, all compounds	2E+3 LLI wall (3E+3)	7E+3	3E-6	9E-9	- 4E-5 4E-4
74	Tungsten-187	D, all compounds	2E+3	9E+3	4E-6	1E-8	3E-5 3E-4
74	Tungsten-188	D, all compounds	4E+2 LLI wall (5E+2)	1E+3	5E-7	2E-9	- 7E-6 7E-5
75	Rhenium-177 ²	D, all compounds except those given for W	9E+4 St wall (1E+5)	3E+5	1E-4	4E-7	- - - 2E-3 2E-2
		W, oxides, hydroxides and nitrates	-	4E+5	1E-4	5E-7	- -
75	Rhenium-178 ²	D, see ¹⁷⁷ Re	7E+4 St wall (1E+5)	3E+5	1E-4	4E-7	- -
		W, see ¹⁷⁷ Re	-	3E+5	1E-4	4E-7	1E-3 1E-2
75	Rhenium-181	D, see ¹⁷⁷ Re W, see ¹⁷⁷ Re	5E+3 - 9E+3	9E+3 4E-6	4E-6 1E-8	1E-8 7E-5	7E-4 -
75	Rhenium-182 (12.7 h)	D, see ¹⁷⁷ Re W, see ¹⁷⁷ Re	7E+3 - 2E+4	1E+4 2E+3	5E-6 6E-6	2E-8 2E-8	9E-5 -
75	Rhenium-182 (64.0 h)	D, see ¹⁷⁷ Re W, see ¹⁷⁷ Re	1E+3 - 2E+3	2E+3 9E-7	1E-6 3E-9	3E-9 2E-5	2E-4 -
75	Rhenium-184m	D, see ¹⁷⁷ Re W, see ¹⁷⁷ Re	2E+3 - 4E+2	3E+3 2E-7	1E-6 6E-10	4E-9 -	3E-5 -
75	Rhenium-184	D, see ¹⁷⁷ Re W, see ¹⁷⁷ Re	2E+3 - 1E+3	4E+3 6E-7	1E-6 2E-9	5E-9 -	3E-5 -
75	Rhenium-186m	D, see ¹⁷⁷ Re	1E+3 - 2E+3	2E+3 (2E+3) 2E+2	7E-7 -	- 3E-9 2E-10	- 2E-5 -
		W, see ¹⁷⁷ Re	-	6E-8	-	- 2E-10	- -
75	Rhenium-186	D, see ¹⁷⁷ Re W, see ¹⁷⁷ Re	2E+3 - 2E+3	3E+3 2E+3	1E-6 7E-7	4E-9 2E-9	3E-5 -

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
75 Rhenium-187	D, see ^{177}Re	6E+5 St wall	8E+5	4E-4	-	8E-3	8E-2
	W, see ^{177}Re	-	(9E+5) 1E+5	- 4E-5	1E-6 1E-7	- -	- -
75 Rhenium-188m ²	D, see ^{177}Re	8E+4	1E+5	6E-5	2E-7	1E-3	1E-2
	W, see ^{177}Re	-	1E+5	6E-5	2E-7	-	-
75 Rhenium-188	D, see ^{177}Re	2E+3	3E+3	1E-6	4E-9	2E-5	2E-4
	W, see ^{177}Re	-	3E+3	1E-6	4E-9	-	-
75 Rhenium-189	D, see ^{177}Re	3E+3	5E+3	2E-6	7E-9	4E-5	4E-4
	W, see ^{177}Re	-	4E+3	2E-6	6E-9	-	-
76 Osmium-180 ²	D, all compounds except those given for W and Y	1E+5	4E+5	2E-4	5E-7	1E-3	1E-2
	W, halides and nitrates	-	5E+5	2E-4	7E-7	-	-
	Y, oxides and hydroxides-	5E+5	2E-4	6E-7	-	-	-
76 Osmium-181 ²	D, see ^{180}Os	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
	W, see ^{180}Os	-	5E+4	2E-5	6E-8	-	-
	Y, see ^{180}Os	-	4E+4	2E-5	6E-8	-	-
76 Osmium-182	D, see ^{180}Os	2E+3	6E+3	2E-6	8E-9	3E-5	3E-4
	W, see ^{180}Os	-	4E+3	2E-6	6E-9	-	-
	Y, see ^{180}Os	-	4E+3	2E-6	6E-9	-	-
76 Osmium-185	D, see ^{180}Os	2E+3	5E+2	2E-7	7E-10	3E-5	3E-4
	W, see ^{180}Os	-	8E+2	3E-7	1E-9	-	-
	Y, see ^{180}Os	-	8E+2	3E-7	1E-9	-	-
76 Osmium-189m	D, see ^{180}Os	8E+4	2E+5	1E-4	3E-7	1E-3	1E-2
	W, see ^{180}Os	-	2E+5	9E-5	3E-7	-	-
	Y, see ^{180}Os	-	2E+5	7E-5	2E-7	-	-
76 Osmium-191m	D, see ^{180}Os	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
	W, see ^{180}Os	-	2E+4	8E-6	3E-8	-	-
	Y, see ^{180}Os	-	2E+4	7E-6	2E-8	-	-
76 Osmium-191	D, see ^{180}Os	2E+3 LLI wall (3E+3)	2E+3	9E-7	3E-9	-	-
	W, see ^{180}Os	-	2E+3	7E-7	2E-9	-	-
	Y, see ^{180}Os	-	1E+3	6E-7	2E-9	-	-
76 Osmium-193	D, see ^{180}Os	2E+3 LLI wall (2E+3)	5E+3	2E-6	6E-9	-	-
	W, see ^{180}Os	-	-	-	-	2E-5	2E-4
	Y, see ^{180}Os	-	3E+3	1E-6	4E-9	-	-
76 Osmium-194	D, see ^{180}Os	4E+2 LLI wall (6E+2)	4E+1	2E-8	6E-11	-	-
	W, see ^{180}Os	-	-	-	-	8E-6	8E-5
	Y, see ^{180}Os	-	6E+1	2E-8	8E-11	-	-
77 Iridium-182 ²	D, all compounds except those given for W and Y	4E+4 St wall (4E+4)	1E+5	6E-5	2E-7	-	-
		-	-	-	-	6E-4	6E-3

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
					Air (μ Ci/ml)	Water (μ Ci/ml)	
		W, halides, nitrates and metallic iridium Y, oxides and hydroxides-	- 1E+5	2E+5 5E-5	6E-5 2E-7	2E-7 -	- -
77	Iridium-184	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	8E+3 - -	2E+4 3E+4 3E+4	1E-5 1E-5 1E-5	3E-8 5E-8 4E-8	1E-4 - -
	Iridium-185	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	5E+3 - -	1E+4 1E+4 1E+4	5E-6 5E-6 4E-6	2E-8 2E-8 1E-8	7E-5 - -
	Iridium-186	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	2E+3 - -	8E+3 6E+3 6E+3	3E-6 3E-6 2E-6	1E-8 9E-9 8E-9	3E-5 - -
77	Iridium-187	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	1E+4 - -	3E+4 3E+4 3E+4	1E-5 1E-5 1E-5	5E-8 4E-8 4E-8	1E-4 - -
	Iridium-188	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	2E+3 - -	5E+3 4E+3 3E+3	2E-6 1E-6 1E-6	6E-9 5E-9 5E-9	3E-5 - -
	Iridium-189	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	5E+3 (5E+3) - -	5E+3 - 4E+3 4E+3	2E-6 - 2E-6 1E-6	7E-9 - 5E-9 5E-9	- - 7E-5 7E-4
77	Iridium-190m ²	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	2E+5 - -	2E+5 2E+5 2E+5	8E-5 9E-5 8E-5	3E-7 3E-7 3E-7	2E-3 - -
	Iridium-190	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	1E+3 - -	9E+2 1E+3 9E+2	4E-7 4E-7 4E-7	1E-9 1E-9 1E-9	1E-5 - -
	Iridium-192m	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	3E+3 - -	9E+1 2E+2 2E+1	4E-8 9E-8 6E-9	1E-10 3E-10 2E-11	4E-5 - -
77	Iridium-192	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	9E+2 - -	3E+2 4E+2 2E+2	1E-7 2E-7 9E-8	4E-10 6E-10 3E-10	1E-5 - -
	Iridium-194m	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	6E+2 - -	9E+1 2E+2 1E+2	4E-8 7E-8 4E-8	1E-10 2E-10 1E-10	9E-6 - -
	Iridium-194	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	1E+3 - -	3E+3 2E+3 2E+3	1E-6 9E-7 8E-7	4E-9 3E-9 3E-9	1E-5 - -
77	Iridium-195m	D, see ^{182}Ir W, see ^{182}Ir Y, see ^{182}Ir	8E+3 - -	2E+4 3E+4 2E+4	1E-5 1E-5 9E-6	3E-8 4E-8 3E-8	1E-4 - -
	Iridium-195	D, see ^{182}Ir W, see ^{182}Ir	1E+4 - -	4E+4 5E+4 2E-5	2E-5 2E-5 7E-8	6E-8 7E-8 -	2E-3 - -

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
	Y, see ^{182}Ir	-	4E+4	2E-5	6E-8	-	-
78	Platinum-186	D, all compounds	1E+4	4E+4	2E-5	5E-8	2E-4
78	Platinum-188	D, all compounds	2E+3	2E+3	7E-7	2E-9	2E-5
78	Platinum-189	D, all compounds	1E+4	3E+4	1E-5	4E-8	1E-4
78	Platinum-191	D, all compounds	4E+3	8E+3	4E-6	1E-8	5E-5
78	Platinum-193m	D, all compounds	3E+3 LLI wall (3E+4)	6E+3	3E-6	8E-9	-
78	Platinum-193	D, all compounds	4E+4 LLI wall (5E+4)	2E+4	1E-5	3E-8	-
78	Platinum-195m	D, all compounds	2E+3 LLI wall (2E+3)	4E+3	2E-6	6E-9	-
78	Platinum-197m ²	D, all compounds	2E+4	4E+4	2E-5	6E-8	2E-4
78	Platinum-197	D, all compounds	3E+3	1E+4	4E-6	1E-8	4E-5
78	Platinum-199 ²	D, all compounds	5E+4	1E+5	6E-5	2E-7	7E-4
78	Platinum-200	D, all compounds	1E+3	3E+3	1E-6	5E-9	2E-5
79	Gold-193	D, all compounds except those given for W and Y W, halides and nitrates Y, oxides and hydroxides-	9E+3 - 2E+4	3E+4 2E+4 8E-6	1E-5 9E-6 3E-8	4E-8 3E-8 -	1E-4 - -
79	Gold-194	D, see ^{193}Au W, see ^{193}Au Y, see ^{193}Au	3E+3 - -	8E+3 5E+3 5E+3	3E-6 2E-6 2E-6	1E-8 8E-9 7E-9	4E-5 - -
79	Gold-195	D, see ^{193}Au W, see ^{193}Au Y, see ^{193}Au	5E+3 - -	1E+4 1E+3 4E+2	5E-6 6E-7 2E-7	2E-8 2E-9 6E-10	7E-5 - -
79	Gold-198m	D, see ^{193}Au W, see ^{193}Au Y, see ^{193}Au	1E+3 - -	3E+3 1E+3 1E+3	1E-6 5E-7 5E-7	4E-9 2E-9 2E-9	1E-5 - -
79	Gold-198	D, see ^{193}Au W, see ^{193}Au Y, see ^{193}Au	1E+3 - -	4E+3 2E+3 2E+3	2E-6 8E-7 7E-7	5E-9 3E-9 2E-9	2E-5 - -
79	Gold-199	D, see ^{193}Au	3E+3 - -	9E+3 - 4E+3	4E-6 - 2E-6	1E-8 - 6E-9	- 4E-5 -
79	Gold-200m	D, see ^{193}Au W, see ^{193}Au Y, see ^{193}Au	1E+3 - -	4E+3 3E+3 2E+4	1E-6 1E-6 1E-6	5E-9 4E-9 3E-9	2E-5 - -

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
79 Gold-200 ²	D, see ^{193}Au	3E+4	6E+4	3E-5	9E-8	4E-4	4E-3
	W, see ^{193}Au	-	8E+4	3E-5	1E-7	-	-
	Y, see ^{193}Au	-	7E+4	3E-5	1E-7	-	-
79 Gold-201 ²	D, see ^{193}Au	7E+4 St wall (9E+4)	2E+5	9E-5	3E-7	-	-
	W, see ^{193}Au	-	2E+5	1E-4	3E-7	-	1E-2
	Y, see ^{193}Au	-	2E+5	9E-5	3E-7	-	-
80 Mercury-193m	Vapor	-	8E+3	4E-6	1E-8	-	-
	Organic D	4E+3	1E+4	5E-6	2E-8	6E-5	6E-4
	D, sulfates	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
	W, oxides, hydroxides, halides, nitrates and sulfides	-	8E+3	3E-6	1E-8	-	-
80 Mercury-193	Vapor	-	3E+4	1E-5	4E-8	-	-
	Organic D	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
	D, see $^{193\text{m}}\text{Hg}$	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
	W, see $^{193\text{m}}\text{Hg}$	-	4E+4	2E-5	6E-8	-	-
80 Mercury-194	Vapor	-	3E+1	1E-8	4E-11	-	-
	Organic D	2E+1	3E+1	1E-8	4E-11	2E-7	2E-6
	D, see $^{193\text{m}}\text{Hg}$	8E+2	4E+1	2E-8	6E-11	1E-5	1E-4
	W, see $^{193\text{m}}\text{Hg}$	-	1E+2	5E-8	2E-10	-	-
80 Mercury-195m	Vapor	-	4E+3	2E-6	6E-9	-	-
	Organic D	3E+3	6E+3	3E-6	8E-9	4E-5	4E-4
	D, see $^{193\text{m}}\text{Hg}$	2E+3	5E+3	2E-6	7E-9	3E-5	3E-4
	W, see $^{193\text{m}}\text{Hg}$	-	4E+3	2E-6	5E-9	-	-
80 Mercury-195	Vapor	-	3E+4	1E-5	4E-8	-	-
	Organic D	2E+4	5E+4	2E-5	6E-8	2E-4	2E-3
	D, see $^{193\text{m}}\text{Hg}$	1E+4	4E+4	1E-5	5E-8	2E-4	2E-3
	W, see $^{193\text{m}}\text{Hg}$	-	3E+4	1E-5	5E-8	-	-
80 Mercury-197m	Vapor	-	5E+3	2E-6	7E-9	-	-
	Organic D	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
	D, see $^{193\text{m}}\text{Hg}$	3E+3	7E+3	3E-6	1E-8	4E-5	4E-4
	W, see $^{193\text{m}}\text{Hg}$	-	5E+3	2E-6	7E-9	-	-
80 Mercury-197	Vapor	-	8E+3	4E-6	1E-8	-	-
	Organic D	7E+3	1E+4	6E-6	2E-8	9E-5	9E-4
	D, see $^{193\text{m}}\text{Hg}$	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
	W, see $^{193\text{m}}\text{Hg}$	-	9E+3	4E-6	1E-8	-	-
80 Mercury-199m ²	Vapor	-	8E+4	3E-5	1E-7	-	-
	Organic D	6E+4	2E+5	7E-5	2E-7	-	-
	St wall (1E+5)	-	-	-	-	1E-3	1E-2
	D, see $^{193\text{m}}\text{Hg}$	6E+4	1E+5	6E-5	2E-7	8E-4	8E-3
	W, see $^{193\text{m}}\text{Hg}$	-	2E+5	7E-5	2E-7	-	-
80 Mercury-203	Vapor	-	8E+2	4E-7	1E-9	-	-
	Organic D	5E+2	8E+2	3E-7	1E-9	7E-6	7E-5
	D, see $^{193\text{m}}\text{Hg}$	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
	W, see $^{193\text{m}}\text{Hg}$	-	1E+3	5E-7	2E-9	-	-
81 Thallium-194m ²	D, all compounds	5E+4 St wall	2E+5	6E-5	2E-7	-	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
		(7E+4)	-	-	-	1E-3	1E-2
81	Thallium-194 ²	D, all compounds	3E+5 St wall (3E+5)	6E+5	2E-4	8E-7	-
81	Thallium-195 ²	D, all compounds	6E+4	1E+5	5E-5	2E-7	9E-4
81	Thallium-197	D, all compounds	7E+4	1E+5	5E-5	2E-7	1E-3
81	Thallium-198m ²	D, all compounds	3E+4	5E+4	2E-5	8E-8	4E-4
81	Thallium-198	D, all compounds	2E+4	3E+4	1E-5	5E-8	3E-3
81	Thallium-199	D, all compounds	6E+4	8E+4	4E-5	1E-7	9E-4
81	Thallium-200	D, all compounds	8E+3	1E+4	5E-6	2E-8	1E-4
81	Thallium-201	D, all compounds	2E+4	2E+4	9E-6	3E-8	2E-4
81	Thallium-202	D, all compounds	4E+3	5E+3	2E-6	7E-9	5E-5
81	Thallium-204	D, all compounds	2E+3	2E+3	9E-7	3E-9	2E-5
82	Lead-195m ²	D, all compounds	6E+4	2E+5	8E-5	3E-7	8E-3
82	Lead-198	D, all compounds	3E+4	6E+4	3E-5	9E-8	4E-4
82	Lead-199 ²	D, all compounds	2E+4	7E+4	3E-5	1E-7	3E-4
82	Lead-200	D, all compounds	3E+3	6E+3	3E-6	9E-9	4E-5
82	Lead-201	D, all compounds	7E+3	2E+4	8E-6	3E-8	1E-4
82	Lead-202m	D, all compounds	9E+3	3E+4	1E-5	4E-8	1E-4
82	Lead-202	D, all compounds	1E+2	5E+1	2E-8	7E-11	2E-6
82	Lead-203	D, all compounds	5E+3	9E+3	4E-6	1E-8	7E-5
82	Lead-205	D, all compounds	4E+3	1E+3	6E-7	2E-9	5E-5
82	Lead-209	D, all compounds	2E+4	6E+4	2E-5	8E-8	3E-4
82	Lead-210	D, all compounds	6E-1 Bone surf (1E+0)	2E-1 Bone surf (4E-1)	1E-10	-	-
						6E-13	1E-8
82	Lead-211 ²	D, all compounds	1E+4	6E+2	3E-7	9E-10	2E-4
82	Lead-212	D, all compounds	8E+1 Bone surf (1E+2)	3E+1	1E-8	5E-11	-
							2E-6
82	Lead-214 ²	D, all compounds	9E+3	8E+2	3E-7	1E-9	1E-4
83	Bismuth-200 ²	D, nitrates W, all other compounds	3E+4 - 1E+5	8E+4 - 4E+5	4E-5 - 4E-5	1E-7 - 1E-7	4E-4 - -
83	Bismuth-201 ²	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	1E+4 - 4E+4	3E+4 - 2E-5	1E-5 - 5E-8	4E-8 - 5E-8	2E-4 - -

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
83 Bismuth-202 ²	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	1E+4 -	4E+4 8E+4	2E-5 3E-5	6E-8 1E-7	2E-4 -	2E-3 -
83 Bismuth-203	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	2E+3 -	7E+3 6E+3	3E-6 3E-6	9E-9 9E-9	3E-5 -	3E-4 -
83 Bismuth-205	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	1E+3 -	3E+3 1E+3	1E-6 5E-7	3E-9 2E-9	2E-5 -	2E-4 -
83 Bismuth-206	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	6E+2 -	1E+3 9E+2	6E-7 4E-7	2E-9 1E-9	9E-6 -	9E-5 -
83 Bismuth-207	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	1E+3 -	2E+3 4E+2	7E-7 1E-7	2E-9 5E-10	1E-5 -	1E-4 -
83 Bismuth-210m	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	4E+1 -	5E+0 Kidneys (6E+1) 7E-1	2E-9 Kidneys (6E+0) 3E-10	- 9E-12 9E-13	- 8E-7 -	- 8E-6 -
83 Bismuth-210	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	8E+2 - -	2E+2 Kidneys (4E+2) 3E+1	1E-7 - 1E-8	- 5E-10 4E-11	1E-5 - -	1E-4 - -
83 Bismuth-212 ²	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	5E+3 -	2E+2 3E+2	1E-7 1E-7	3E-10 4E-10	7E-5 -	7E-4 -
83 Bismuth-213 ²	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	7E+3 -	3E+2 4E+2	1E-7 1E-7	4E-10 5E-10	1E-4 -	1E-3 -
83 Bismuth-214 ²	D, see ²⁰⁰ Bi W, see ²⁰⁰ Bi	2E+4 -	8E+2 St wall (2E+4) 9E-2	3E-7 - 4E-7	1E-9 - 1E-9	- 3E-4 -	- 3E-3 -
84 Polonium-203 ²	D, all compounds except those given for W W, oxides, hydroxides and nitrates	3E+4 -	6E+4 9E+4	3E-5 4E-5	9E-8 1E-7	3E-4 -	3E-3 -
84 Polonium-205 ²	D, see ²⁰³ Po W, see ²⁰³ Po	2E+4 -	4E+4 7E+4	2E-5 3E-5	5E-8 1E-7	3E-4 -	3E-3 -
84 Polonium-207	D, see ²⁰³ Po W, see ²⁰³ Po	8E+3 -	3E+4 3E+4	1E-5 1E-5	3E-8 4E-8	1E-4 -	1E-3 -
84 Polonium-210	D, see ²⁰³ Po W, see ²⁰³ Po	3E+0 -	6E-1 6E-1	3E-10 3E-10	9E-13 9E-13	4E-8 -	4E-7 -
85 Astatine-207 ²	D, halides W	6E+3 -	3E+3 2E+3	1E-6 9E-7	4E-9 3E-9	8E-5 -	8E-4 -
85 Astatine-211	D, halides W	1E+2 -	8E+1 5E+1	3E-8 2E-8	1E-10 8E-11	2E-6 -	2E-5 -
86 Radon-220	With daughters removed With daughters present	- -	2E+4 2E+1 (or 12 working)	7E-6 9E-9 (or 1.0)	2E-8 3E-11	- -	- -

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
				level months)	working level)		
86	Radon-222	With daughters removed With daughters present	- -	1E+4 1E+2 (or 4 working level months)	4E-6 3E-8 (or 0.33 working level)	1E-8 1E-10	- -
87	Francium-222 ²	D, all compounds	2E+3	5E+2	2E-7	6E-10	3E-5
87	Francium-223 ²	D, all compounds	6E+2	8E+2	3E-7	1E-9	8E-6
88	Radium-223	W, all compounds	5E+0 Bone surf (9E+0)	7E-1	3E-10	9E-13	- -
88	Radium-224	W, all compounds	8E+0 Bone surf (2E+1)	2E+0	7E-10	2E-12	- -
88	Radium-225	W, all compounds	8E+0 Bone surf (2E+1)	7E-1	3E-10	9E-13	- -
88	Radium-226	W, all compounds	2E+0 Bone surf (5E+0)	6E-1	3E-10	9E-13	- -
88	Radium-227 ²	W, all compounds	2E+4 Bone surf (2E+4)	1E+4 Bone surf (2E+4)	6E-6	- 3E-8	- 3E-4
88	Radium-228	W, all compounds	2E+0 Bone surf (4E+0)	1E+0	5E-10	2E-12	- 6E-8
89	Actinium-224	D, all compounds except those given for W and Y W, halides and nitrates Y, oxides and hydroxides-	2E+3 LLI wall (2E+3) - 5E+1	3E+1 Bone surf (4E+1) 5E+1 2E-8	1E-8 - 2E-8 6E-11	- 5E-11 7E-11 -	- 3E-5 - -
89	Actinium-225	D, see ²²⁴ Ac W, see ²²⁴ Ac Y, see ²²⁴ Ac	5E+1 LLI wall (5E+1) - -	3E-1 Bone surf (5E-1) 6E-1 3E-10	1E-10 - 7E-13 9E-13	- 7E-13 7E-7	- 7E-6
89	Actinium-226	D, see ²²⁴ Ac W, see ²²⁴ Ac Y, see ²²⁴ Ac	1E+2 LLI wall (1E+2) - -	3E+0 Bone surf (4E+0) 5E+0 2E-9	1E-9 - 5E-12 7E-12	- 2E-6	- 2E-5
89	Actinium-227	D, see ²²⁴ Ac W, see ²²⁴ Ac	2E-1 Bone surf (4E-1) - -	4E-4 Bone surf (8E-4) 2E-3 Bone surf	2E-13 - 1E-15	- 5E-9	5E-8 -

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			Inhalation		Air (μ Ci/ml)	Water (μ Ci/ml)	
89 Actinium-228	D, see ^{224}Ac	-	(3E-3)	-	4E-15	-	-
		-	4E-3	2E-12	6E-15	-	-
		2E+3	9E+0 Bone surf	4E-9	-	3E-5	3E-4
90 Thorium-226 ²	W, all compounds except those given for Y	-	(2E+1)	-	2E-11	-	-
		-	4E+1 Bone surf	2E-8	-	-	-
		-	(6E+1)	-	8E-11	-	-
90 Thorium-227	Y, see ^{224}Ac	-	4E+1	2E-8	6E-11	-	-
		5E+3 St wall (5E+3)	2E+2	6E-8	2E-10	-	-
		1E+2	6E-8	2E-10	-	7E-5	7E-4
90 Thorium-228	Y, oxides and hydroxides-	1E+2	3E-1	1E-10	5E-13	2E-6	2E-5
		-	3E-1	1E-10	5E-13	-	-
		6E+0 Bone surf (1E+1)	1E-2 Bone surf (2E-2)	4E-12	-	3E-14	2E-7
90 Thorium-229	Y, see ^{226}Th	-	2E-2	7E-12	2E-14	-	-
		6E-1 Bone surf (1E+0)	9E-4 Bone surf (2E-3)	4E-13	-	-	-
		-	2E-3 Bone surf (3E-3)	1E-12	3E-15	2E-8	2E-7
90 Thorium-230	Y, see ^{226}Th	4E+0 Bone surf (9E+0)	6E-3 Bone surf (2E-2)	3E-12	-	-	-
		-	2E-2 Bone surf (2E-2)	6E-12	2E-14	1E-7	1E-6
		-	-	-	3E-14	-	-
90 Thorium-231	W, see ^{226}Th	4E+3	6E+3	3E-6	9E-9	5E-5	5E-4
		-	6E+3	3E-6	9E-9	-	-
90 Thorium-232	Y, see ^{226}Th	7E-1 Bone surf (2E+0)	1E-3 Bone surf (3E-3)	5E-13	-	-	-
		-	3E-3 Bone surf (4E-3)	1E-12	4E-15	3E-8	3E-7
		-	-	-	6E-15	-	-
90 Thorium-234	W, see ^{226}Th	3E+2 LLI wall (4E+2)	2E+2	8E-8	3E-10	-	-
		-	-	-	-	5E-6	5E-5
91 Protactinium-227 ²	Y, oxides and hydroxides-	2E+2	6E-8	2E-10	-	-	-
		4E+3 1E+2	1E+2 4E-8	5E-8 1E-10	2E-10	5E-5	5E-4
91 Protactinium-228	W, see ^{227}Pa	1E+3	1E+1 Bone surf (2E+1)	5E-9	-	2E-5	2E-4
		-	-	3E-11	-	-	-

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			Inhalation		Air (μ Ci/ml)	Water (μ Ci/ml)		
	Y, see ^{227}Pa	-	1E+1	5E-9	2E-11	-	-	
91	Protactinium-230	W, see ^{227}Pa	6E+2 Bone surf (9E+2)	5E+0 - 4E+0	2E-9 - 1E-9	7E-12 - 5E-12	-	
	Y, see ^{227}Pa	-	-	-	-	1E-5	1E-4	
91	Protactinium-231	W, see ^{227}Pa	2E-1 Bone surf (5E-1)	2E-3 Bone surf (4E-3) 4E-3 Bone surf (6E-3)	6E-13 - 2E-12 -	- 6E-15 - 8E-15	-	
	Y, see ^{227}Pa	-	-	-	-	6E-9	6E-8	
91	Protactinium-232	W, see ^{227}Pa	1E+3	2E+1 Bone surf (6E+1) 6E+1 Bone surf (7E+1)	9E-9 - 2E-8 -	- 8E-11 - 1E-10	2E-5	2E-4
	Y, see ^{227}Pa	-	-	-	-	-	-	
91	Protactinium-233	W, see ^{227}Pa	1E+3 LLI wall (2E+3)	7E+2	3E-7	1E-9	-	
	Y, see ^{227}Pa	-	-	-	-	2E-5	2E-4	
91	Protactinium-234	W, see ^{227}Pa	2E+3	8E+3	3E-6	1E-8	3E-5	
	Y, see ^{227}Pa	-	7E+3	3E-6	9E-9	-	-	
92	Uranium-230	D, UF, UOF, UO(NO)	4E+0 Bone surf (6E+0)	4E-1 Bone surf (6E-1)	2E-10	-	-	
	W, UO, UF, UCl	-	-	-	8E-13	8E-8	8E-7	
	Y, UO, UO	-	4E-1 3E-1	1E-10 1E-10	5E-13 4E-13	-	-	
92	Uranium-231	D, see ^{230}U	5E+3 LLI wall (4E+3)	8E+3	3E-6	1E-8	-	
	W, see ^{230}U	-	-	-	-	6E-5	6E-4	
	Y, see ^{230}U	-	6E+3 5E+3	2E-6 2E-6	8E-9 6E-9	-	-	
92	Uranium-232	D, see ^{230}U	2E+0 Bone surf (4E+0)	2E-1 Bone surf (4E-1)	9E-11	-	-	
	W, see ^{230}U	-	-	-	6E-13	6E-8	6E-7	
	Y, see ^{230}U	-	4E-1 8E-3	2E-10 3E-12	5E-13 1E-14	-	-	
92	Uranium-233	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-	
	W, see ^{230}U	-	-	-	3E-12	3E-7	3E-6	
	Y, see ^{230}U	-	7E-1 4E-2	3E-10 2E-11	1E-12 5E-14	-	-	
92	Uranium-234 ³	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-	
	W, see ^{230}U	-	-	-	3E-12	3E-7	3E-6	
	Y, see ^{230}U	-	7E-1 4E-2	3E-10 2E-11	1E-12 5E-14	-	-	
92	Uranium-235 ³	D, see ^{230}U	1E+1 Bone surf	1E+0 Bone surf	6E-10	-	-	

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			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
92 Uranium-236	D, see ^{230}U	(2E+1)	(2E+0)	-	3E-12	3E-7	3E-6
		W, see ^{230}U	-	8E-1	3E-10	1E-12	-
		Y, see ^{230}U	-	4E-2	2E-11	6E-14	-
		1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-	-
92 Uranium-237	D, see ^{230}U	W, see ^{230}U	-	-	3E-12	3E-7	3E-6
		Y, see ^{230}U	-	8E-1	3E-10	1E-12	-
		2E+3 LLI wall (2E+3)	3E+3	1E-6	4E-9	-	-
		W, see ^{230}U	-	-	-	3E-5	3E-4
		Y, see ^{230}U	-	2E+3	7E-7	2E-9	-
92 Uranium-238 ³	D, see ^{230}U	W, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	6E-10	-	-
		Y, see ^{230}U	-	-	-	3E-12	3E-7
		W, see ^{230}U	-	8E-1	3E-10	1E-12	-
		Y, see ^{230}U	-	4E-2	2E-11	6E-14	-
92 Uranium-239 ²	D, see ^{230}U	7E+4	2E+5	8E-5	3E-7	9E-4	9E-3
		W, see ^{230}U	-	2E+5	7E-5	2E-7	-
		Y, see ^{230}U	-	2E+5	6E-5	2E-7	-
92 Uranium-240	D, see ^{230}U	1E+3	4E+3	2E-6	5E-9	2E-5	2E-4
		W, see ^{230}U	-	3E+3	1E-6	4E-9	-
		Y, see ^{230}U	-	2E+3	1E-6	3E-9	-
92 Uranium-natural ³	D, see ^{230}U	W, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-
		Y, see ^{230}U	-	-	-	3E-12	3E-7
		W, see ^{230}U	-	8E-1	3E-10	9E-13	-
		Y, see ^{230}U	-	5E-2	2E-11	9E-14	-
93 Neptunium-232 ²	W, all compounds	1E+5	2E+3 Bone surf (5E+2)	7E-7	-	2E-3	2E-2
		-	-	-	6E-9	-	-
93 Neptunium-233 ²	W, all compounds	8E+5	3E+6	1E-3	4E-6	1E-2	1E-1
93 Neptunium-234	W, all compounds	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
93 Neptunium-235	W, all compounds	2E+4 LLI wall (2E+4)	8E+2 Bone surf (1E+3)	3E-7	-	-	-
93 Neptunium-236 (1.15E+5 y)	W, all compounds	3E+0 Bone surf (6E+0)	2E-2 Bone surf (5E-2)	9E-12	-	-	-
93 Neptunium-236 (22.5 h)	W, all compounds	3E+3 Bone surf (4E+3)	3E+1 Bone surf (7E+1)	1E-8	-	-	-
93 Neptunium-237	W, all compounds	5E-1 Bone surf (1E+0)	4E-3 Bone surf (1E-2)	2E-12	-	-	-
93 Neptunium-238	W, all compounds	1E+3	6E+1	3E-8	-	2E-5	2E-4

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
				Bone surf (2E+2)	-	2E-10	-
93	Neptunium-239	W, all compounds	2E+3 LLI wall (2E+3)	2E+3	9E-7	3E-9	-
93	Neptunium-240 ²	W, all compounds	2E+4	8E+4	3E-5	1E-7	3E-4
94	Plutonium-234	W, all compounds except PuO Y, PuO	8E+3 -	2E+2 2E+2	9E-8 8E-8	3E-10 3E-10	1E-4
94	Plutonium-235 ²	W, see ²³⁴ Pu Y, see ²³⁴ Pu	9E+5 -	3E+6 3E+6	1E-3 1E-3	4E-6 3E-6	1E-1
94	Plutonium-236	W, see ²³⁴ Pu Y, see ²³⁴ Pu	2E+0 Bone surf (4E+0) -	2E-2 Bone surf (4E-2) 4E-2	8E-12 -	-	-
94	Plutonium-237	W, see ²³⁴ Pu Y, see ²³⁴ Pu	1E+4 -	3E+3 3E+3	1E-6 1E-6	5E-9 4E-9	2E-4
94	Plutonium-238	W, see ²³⁴ Pu Y, see ²³⁴ Pu	9E-1 Bone surf (2E+0) -	7E-3 Bone surf (1E-2) 2E-2	3E-12 -	-	-
94	Plutonium-239	W, see ²³⁴ Pu Y, see ²³⁴ Pu	8E-1 Bone surf (1E+0) -	6E-3 Bone surf (1E-2) 2E-2 Bone surf (2E-2)	3E-12 -	-	-
94	Plutonium-240	W, see ²³⁴ Pu Y, see ²³⁴ Pu	8E-1 Bone surf (1E+0) -	6E-3 Bone surf (1E-2) 2E-2 Bone surf (2E-2)	3E-12 -	-	-
94	Plutonium-241	W, see ²³⁴ Pu Y, see ²³⁴ Pu	4E+1 Bone surf (7E+1) -	3E-1 Bone surf (6E-1) 8E-1 Bone surf (1E+0)	1E-10 -	8E-13 -	1E-6
94	Plutonium-242	W, see ²³⁴ Pu Y, see ²³⁴ Pu	8E-1 Bone surf (1E+0) -	7E-3 Bone surf (1E-2) 2E-2 Bone surf (2E-2)	3E-12 -	2E-14 -	2E-7
94	Plutonium-243	W, see ²³⁴ Pu Y, see ²³⁴ Pu	2E+4 -	4E+4 4E+4	2E-5 2E-5	5E-8 5E-8	2E-4
94	Plutonium-244	W, see ²³⁴ Pu	8E-1	7E-3	3E-12	-	-

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Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1	Col. 2	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)	Air (μ Ci/ml)	Water (μ Ci/ml)	
Y, see ^{234}Pu		Bone surf (2E+0)	Bone surf (1E-2)	-	2E-14	2E-8	2E-7
		-	2E-2	7E-12	-	-	-
		-	Bone surf (2E-2)	-	2E-14	-	-
94	Plutonium-245	W, see ^{234}Pu Y, see ^{234}Pu	2E+3	5E+3	2E-6	6E-9	3E-5
		-	4E+3	2E-6	6E-9	-	-
94	Plutonium-246	W, see ^{234}Pu	4E+2 LLI wall (4E+2)	3E+2	1E-7	4E-10	-
		Y, see ^{234}Pu	-	3E+2	1E-7	4E-10	6E-6
95	Americium-237 ²	W, all compounds	8E+4	3E+5	1E-4	4E-7	1E-3
95	Americium-238 ²	W, all compounds	4E+4	3E+3 Bone surf (6E+3)	1E-6	-	5E-4
		-	-	-	9E-9	-	-
95	Americium-239	W, all compounds	5E+3	1E+4	5E-6	2E-8	7E-5
95	Americium-240	W, all compounds	2E+3	3E+3	1E-6	4E-9	3E-5
95	Americium-241	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	-	-
		-	-	-	2E-14	2E-8	2E-7
95	Americium-242m	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	-	-
		-	-	-	2E-14	2E-8	2E-7
95	Americium-242	W, all compounds	4E+3	8E+1 Bone surf (9E+1)	4E-8	-	5E-5
		-	-	-	1E-10	-	-
95	Americium-243	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	-	-
		-	-	-	2E-14	2E-8	2E-7
95	Americium-244m ²	W, all compounds	6E+4 St wall (8E+4)	4E+3 Bone surf (7E+3)	2E-6	-	-
		-	-	-	1E-8	1E-3	1E-2
95	Americium-244	W, all compounds	3E+3	2E+2 Bone surf (3E+2)	8E-8	-	4E-5
		-	-	-	4E-10	-	-
95	Americium-245	W, all compounds	3E+4	8E+4	3E-5	1E-7	4E-4
95	Americium-246m ²	W, all compounds	5E+4 St wall (6E+4)	2E+5	8E-5	3E-7	-
		-	-	-	-	8E-4	8E-3
95	Americium-246 ²	W, all compounds	3E+4	1E+5	4E-5	1E-7	4E-4
96	Curium-238	W, all compounds	2E+4	1E+3	5E-7	2E-9	2E-4
96	Curium-240	W, all compounds	6E+1 Bone surf (8E+1)	6E-1 Bone surf (6E-1)	2E-10	-	-
		-	-	-	9E-13	1E-6	1E-5

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
96 Curium-241	W, all compounds	1E+3	3E+1 Bone surf (4E+1)	1E-8	-	2E-5	2E-4
		-	-	-	5E-11	-	-
96 Curium-242	W, all compounds	3E+1 Bone surf (5E+1)	3E-1 Bone surf (3E-1)	1E-10	-	-	-
96 Curium-243	W, all compounds	1E+0 Bone surf (2E+0)	9E-3 Bone surf (2E-2)	4E-12	-	-	-
96 Curium-244	W, all compounds	1E+0 Bone surf (3E+0)	1E-2 Bone surf (2E-2)	5E-12	-	-	-
96 Curium-245	W, all compounds	7E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	-	-	-
96 Curium-246	W, all compounds	7E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	-	2E-14	2E-8
96 Curium-247	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	-	2E-14	2E-8
96 Curium-248	W, all compounds	2E-1 Bone surf (4E-1)	2E-3 Bone surf (3E-3)	7E-13	-	4E-15	5E-9
96 Curium-249 ²	W, all compounds	5E+4	2E+4 Bone surf (3E+4)	7E-6	-	7E-4	7E-3
		-	-	-	4E-8	-	-
96 Curium-250	W, all compounds	4E-2 Bone surf (6E-2)	3E-4 Bone surf (5E-4)	1E-13	-	-	-
97 Berkelium-245	W, all compounds	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
97 Berkelium-246	W, all compounds	3E+3	3E+3	1E-6	4E-9	4E-5	4E-4
97 Berkelium-247	W, all compounds	5E-1 Bone surf (1E+0)	4E-3 Bone surf (9E-3)	2E-12	-	1E-14	2E-8
97 Berkelium-249	W, all compounds	2E+2 Bone surf (5E+2)	2E+0 Bone surf (4E+0)	7E-10	-	5E-12	6E-6
97 Berkelium-250	W, all compounds	9E+3	3E+2 Bone surf (7E+2)	1E-7	-	1E-4	1E-3
		-	-	-	1E-9	-	-
98 Californium-244 ²	W, all compounds except those given for Y	3E+4 St wall (3E+4)	6E+2	2E-7	8E-10	-	-

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)			
	Y, oxides and hydroxides-	6E+2	2E-7	8E-10	-	-	
98	Californium-246	W, see ^{244}Cf Y, see ^{244}Cf	4E+2 -	9E+0 9E+0	4E-9 4E-9	1E-11 1E-11	5E-6 -
98	Californium-248	W, see ^{244}Cf Y, see ^{244}Cf	8E+0 - Bone surf (2E+1) - 1E-1	6E-2 - Bone surf (1E-1) 4E-11	3E-11 - 2E-13 1E-13	- - 2E-7 -	- - 2E-6 -
98	Californium-249	W, see ^{244}Cf Y, see ^{244}Cf	5E-1 - Bone surf (1E+0) - 1E-2 - (1E-2)	4E-3 - Bone surf (9E-3) 4E-12 - 2E-14	2E-12 - 1E-14 - 2E-14	- - 2E-8 -	- - 2E-7 -
98	Californium-250	W, see ^{244}Cf Y, see ^{244}Cf	1E+0 - Bone surf (2E+0) - 3E-2	9E-3 - Bone surf (2E-2) 1E-11	4E-12 - 3E-14 4E-14	- - 3E-8 -	- - 3E-7 -
98	Californium-251	W, see ^{244}Cf Y, see ^{244}Cf	5E-1 - Bone surf (1E+0) - 1E-2 - (1E-2)	4E-3 - Bone surf (9E-3) 4E-12 - 2E-14	2E-12 - 1E-14 - 2E-14	- - 2E-8 -	- - 2E-7 -
98	Californium-252	W, see ^{244}Cf Y, see ^{244}Cf	2E+0 - Bone surf (5E+0) - 3E-2	2E-2 - Bone surf (4E-2) 1E-11	8E-12 - 5E-14 5E-14	- - 7E-8 -	- - 7E-7 -
98	Californium-253	W, see ^{244}Cf Y, see ^{244}Cf	2E+2 - Bone surf (4E+2) - 2E+0	2E+0 - 7E-10	8E-10 - 2E-12	3E-12 - 5E-6	- - 5E-5 -
98	Californium-254	W, see ^{244}Cf Y, see ^{244}Cf	2E+0 -	2E-2 2E-2	9E-12 7E-12	3E-14 2E-14	3E-8 -
99	Einsteinium-250	W, all compounds	4E+4 - -	5E+2 Bone surf (1E+3)	2E-7 - 2E-9	- - 6E-4	6E-3 - -
99	Einsteinium-251	W, all compounds	7E+3 - -	9E+2 Bone surf (1E+3)	4E-7 - 2E-9	- - 1E-4	1E-3 - -
99	Einsteinium-253	W, all compounds	2E+2	1E+0	6E-10	2E-12	2E-6
99	Einsteinium-254m	W, all compounds	3E+2 LLI wall (3E+2)	1E+1 - -	4E-9 - -	1E-11 - -	- - 4E-6
99	Einsteinium-254	W, all compounds	8E+0 Bone surf (2E+1)	7E-2 Bone surf (1E-1)	3E-11 - 2E-13	- - 2E-7	- - 2E-6
100	Fermium-252	W, all compounds	5E+2	1E+1	5E-9	2E-11	6E-6
							6E-5

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers	
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2	Col. 3	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)	
			Inhalation ALI (μ Ci)	DAC (μ Ci/ml)				
100	Fermium-253	W, all compounds	1E+3	1E+1	4E-9	1E-11	1E-5	1E-4
100	Fermium-254	W, all compounds	3E+3	9E+1	4E-8	1E-10	4E-5	4E-4
100	Fermium-255	W, all compounds	5E+2	2E+1	9E-9	3E-11	7E-6	7E-5
100	Fermium-257	W, all compounds	2E+1 Bone surf (4E+1)	2E-1 Bone surf (2E-1)	7E-11	-	5E-7	5E-6
101	Mendelevium-257	W, all compounds	7E+3	8E+1 Bone surf (9E+1)	4E-8	-	1E-4	1E-3
101	Mendelevium-258	W, all compounds	-	-	-	1E-10	-	-
-	Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours		Submersion ¹ -	2E+2	1E-7	1E-9	-	-
-	Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than 2 hours		- . . . -	2E-1	1E-10	1E-12	1E-8	1E-7
-	Any single radionuclide not listed above that decays by alpha emission or spontaneous fission, or any mixture for which either the identity or the concentration of any radionuclide in the mixture is not known . . . -		-	4E-4	2E-13	1E-15	2E-9	2E-8

FOOTNOTES:

¹"Submersion" means that values given are for submersion in a hemispherical semi-infinite cloud of airborne material.

²These radionuclides have radiological half-lives of less than 2 hours. The total effective dose equivalent received during operations with these radionuclides might include a significant contribution from external exposure. The DAC values for all radionuclides, other than those designated Class "Submersion," are based upon the committed effective dose equivalent due to the intake of the radionuclide into the body and do NOT include potentially significant contributions to dose equivalent from external exposures. The licensee may substitute 1E-7 μ Ci/ml for the listed DAC to account for the submersion dose prospectively, but should use individual monitoring devices or other radiation measuring instruments that measure external exposure to demonstrate compliance with the limits.

³For soluble mixtures of U-238, U-234, and U-235 in air, chemical toxicity may be the limiting factor. If the percent by weight (enrichment) of U-235 is not greater than 5, the concentration value for a 40-hour workweek is 0.2 milligrams uranium per cubic meter of air average. For any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed 8E-3 (SA) μ Ci-hr/ml, where SA is the specific activity of the uranium inhaled. The specific activity for natural uranium is 6.77E-7 curies per gram U. The specific activity for other mixtures of U-238, U-235, and U-234, if not known, shall be:

$$SA = 3.6E-7 \text{ curies/gram U} \quad \text{U-depleted}$$

$$SA = [0.4 + 0.38 (\text{enrichment}) + 0.0034 (\text{enrichment})^2] E-6, \text{ enrichment} \geq 0.72$$

where enrichment is the percentage by weight of U-235, expressed as percent.

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers						
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)						
NOTES:													
1.	If the identity of each radionuclide in a mixture is known but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.												
2.	If the identity of each radionuclide in the mixture is not known, but it is known that certain radionuclides specified in this appendix are not present in the mixture, the inhalation ALI, DAC, and effluent and sewage concentrations for the mixture are the lowest values specified in this appendix for any radionuclide that is not known to be absent from the mixture; or												
If it is known that Ac-227-D and Cm-250-W are not present		-	7E-4	3E-13	-	-	-						
If, in addition, it is known that Ac-227-W,Y, Th-229-W,Y, Th-230-W, Th-232-W,Y, Pa-231-W,Y, Np-237-W, Pu-239-W, Pu-240-W, Pu-242-W, Am-241-W, Am-242m-W, Am-243-W, Cm-245-W, Cm-246-W, Cm-247-W, Cm-248-W, Bk-247-W, Cf-249-W and Cf-251-W are not present		-	7E-3	3E-12	-	-	-						
If, in addition, it is known that Sm-146-W, Sm-147-W, Gd-148-D,W, Gd-152-D,W, Th-228-W,Y, Th-230-Y, U-232-Y, U-233-Y, U-234-Y, U-235-Y, U-236-Y, U-238-Y, Np-236-W, Pu-236-W,Y, Pu-238-W,Y, Pu-239-Y, Pu-240-Y, Pu-242-Y, Pu-244-W,Y, Cm-243-W, Cm-244-W, Cf-248-W, Cf-249-Y, Cf-250-W,Y, Cf-251-Y, Cf-252-W,Y and Cf-254-W,Y are not present		-	7E-2	3E-11	-	-	-						
If, in addition, it is known that Pb-210-D, Bi-210m-W, Po-210-D,W, Ra-223-W, Ra-225-W, Ra-226-W, Ac-225-D,W,Y, Th-227-W,Y, U-230-D,W,Y, U-232-D,W, Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-Y, Es-254-W, Fm-257-W and Md-258-W are not present		-	7E-1	3E-10	-	-	-						
If, in addition, it is known that Si-32-Y, Ti-44-Y, Fe-60-D, Sr-90-Y, Zr-93-D, Cd-113m-D, Cd-113-D, In-115-D,W, La-138-D, Lu-176-W, Hf-178m-D,W, Hf-182-D,W, Bi-210m-D, Ra-224-W, Ra-228-W, Ac-226-D,W,Y, Pa-230-W,Y, U-233-D,W, U-234-D,W, U-235-D,W, U-236-D,W, U-238-D,W, Pu-241-Y, Bk-249-W, Cf-253-W,Y and Es-253-W are not present		-	7E+0	3E-9	-	-	-						
If it is known that Ac-227-D,W,Y, Th-229-W,Y, Th-232-W,Y, Pa-231-W,Y, Cm-248-W and Cm-250-W are not present		-	-	-	-	1E-14	-						
If, in addition, it is known that Sm-146-W, Gd-148-D,W, Gd-152-D, Th-228-W,Y, Th-230-W,Y, U-232-Y, U-233-Y, U-234-Y, U-235-Y, U-236-Y, U-238-Y, U-Nat-Y, Np-236-W, Np-237-W, Pu-236-W,Y, Pu-238-W,Y, Pu-239-W,Y, Pu-240-W,Y, Pu-242-W,Y, Pu-244-W,Y, Am-241-W, Am-242m-W, Am-243-W, Cm-243-W, Cm-244-W, Cm-245-W, Cm-246-W, Cm-247-W, Bk-247-W, Cf-249-W,Y, Cf-250-W,Y, Cf-251-W,Y, Cf-252-W,Y, and Cf-254-W,Y are not present		-	-	-	1E-13	-							
If, in addition, it is known that Sm-147-W, Gd-152-W, Pb-210-D, Bi-210m-W, Po-210-D,W,		-											

Atomic Radionuclide No.	Class	Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
		Col. 1 Oral Ingestion ALI (μ Ci)	Col. 2 Inhalation ALI (μ Ci)	Col. 3 DAC (μ Ci/ml)	Col. 1 Air (μ Ci/ml)	Col. 2 Water (μ Ci/ml)	Monthly Average Concentration (μ Ci/ml)

Ra-223-W, Ra-225-W, Ra-226-W, Ac-225-D,W,Y,
Th-227-W,Y, U-230-D,W,Y, U-232-D,W, U-Nat-W,
Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-W,Y,
Es-254-W, Fm-257-W and Md-258-W are not
present

If, in addition it is known that Fe-60,
Sr-90, Cd-113m, Cd-113, In-115, I-129,
Cs-134, Sm-145, Sm-147, Gd-148, Gd-152,
Hg-194 (organic), Bi-210m, Ra-223, Ra-224,
Ra-225, Ac-225, Th-228, Th-230, U-233, U-234,
U-235, U-236, U-238, U-Nat, Cm-242, Cf-248,
Es-254, Fm-257 and Md-258 are not present

1E-12

1E-5

3. If a mixture of radionuclides consists of uranium and its daughters in ore dust (10 μ m AMAD particle distribution assumed) prior to chemical separation of the uranium from the ore, the following values may be used for the DAC of the mixture: 6E-11 μ Ci of gross alpha activity from uranium-238, uranium-234, thorium-230, and radium-226 per milliliter of air; 3E-11 μ Ci of natural uranium per milliliter of air; or 45 micrograms of natural uranium per cubic meter of air.
4. If the identity and concentration of each radionuclide in a mixture are known, the limiting values should be derived as follows: determine, for each radionuclide in the mixture, the ratio between the concentration present in the mixture and the concentration otherwise established in this subsection for the specific radionuclide when not in a mixture. The sum of such ratios for all of the radionuclides in the mixture may not exceed "1" (i.e., "unity").

Example: If radionuclides "A," "B" and "C" are present in concentrations C_A , C_B , and C_C , and if the applicable DACs are DAC_A , DAC_B , and DAC_C , respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_A}{DAC_A} + \frac{C_B}{DAC_B} + \frac{C_C}{DAC_C} \leq 1$$

BRC Form 202-2				Texas Department of State Health Services/Radiation Control			
CUMULATIVE OCCUPATIONAL EXPOSURE HISTORY							
1. NAME (LAST, FIRST, MIDDLE INITIAL)		2. IDENTIFICATION NUMBER		3. ID TYPE		MALE <input type="checkbox"/>	5. DATE OF BIRTH
						4. SEX FEMALE <input type="checkbox"/>	
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD <input type="checkbox"/> ESTIMATE <input type="checkbox"/> NO RECORD <input type="checkbox"/>	10. ROUTINE <input type="checkbox"/> PSE <input type="checkbox"/>
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD <input type="checkbox"/> ESTIMATE <input type="checkbox"/> NO RECORD <input type="checkbox"/>	10. ROUTINE <input type="checkbox"/> PSE <input type="checkbox"/>
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD <input type="checkbox"/> ESTIMATE <input type="checkbox"/> NO RECORD <input type="checkbox"/>	10. ROUTINE <input type="checkbox"/> PSE <input type="checkbox"/>
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD <input type="checkbox"/> ESTIMATE <input type="checkbox"/> NO RECORD <input type="checkbox"/>	10. ROUTINE <input type="checkbox"/> PSE <input type="checkbox"/>
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD <input type="checkbox"/> ESTIMATE <input type="checkbox"/> NO RECORD <input type="checkbox"/>	10. ROUTINE <input type="checkbox"/> PSE <input type="checkbox"/>
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER		9. RECORD <input type="checkbox"/> ESTIMATE <input type="checkbox"/> NO RECORD <input type="checkbox"/>	10. ROUTINE <input type="checkbox"/> PSE <input type="checkbox"/>
11. DDE	12. LDE	13. SDE, WB	14. SDE, ME	15. CEDE	16. CDE	17. TEDE	18. TODE
19. SIGNATURE OF MONITORED INDIVIDUAL		20. DATE SIGNED		21. CERTIFYING ORGANIZATION		22. SIGNATURE OF DESIGNEE	
						23. DATE SIGNED	

INSTRUCTIONS AND ADDITIONAL INFORMATION PERTINENT TO THE COMPLETION OF BRC FORM 202-2 <i>(All doses should be stated in rems)</i>															
<ol style="list-style-type: none"> 1. Type or print the full name of the monitored individual in the order of last name (include "Jr," "Sr," "III," etc.), first name, middle initial (if applicable). 2. Enter the individual's identification number, including punctuation. This number should be the 9-digit social security number if at all possible. If the individual has no social security number, enter the number from another official identification such as a passport or work permit. 3. Enter the code for the type of identification used as shown below: <table border="0" style="margin-top: 10px;"> <tr> <th style="text-align: left; padding-right: 10px;"><u>CODE</u></th> <th style="text-align: left; padding-right: 10px;"><u>ID TYPE</u></th> </tr> <tr> <td>SSN</td> <td>U.S. Social Security Number</td> </tr> <tr> <td>PPN</td> <td>Passport Number</td> </tr> <tr> <td>CSI</td> <td>Canadian Social Insurance Number</td> </tr> <tr> <td>WPN</td> <td>Work Permit Number</td> </tr> <tr> <td>IND</td> <td>INDEX Identification Number</td> </tr> <tr> <td>OTH</td> <td>Other</td> </tr> </table> 4. Check the box that denotes the sex of the individual being monitored. 5. Enter the date of birth of the individual being monitored in the format MM/DD/YY. 6. Enter the monitoring period for which this report is filed. The format should be MM/DD/YY - MM/DD/YY. 7. Enter the name of the licensee, registrant, or facility not licensed by the Agency that provided monitoring. 8. Enter the Agency license or registration number or numbers. 9. Place an "X" in Record, Estimate, or No Record. Choose "Record" if the dose data listed represent a final determination of the dose received to the best of the licensee's or registrant's knowledge. Choose "Estimate" only if the listed dose data are preliminary and will be superseded by a final determination resulting in a subsequent report. An example of such an instance would be dose data based on self-reading dosimeter results and the licensee or registrant intends to assign the record dose on the basis of TLD results that are not yet available. 	<u>CODE</u>	<u>ID TYPE</u>	SSN	U.S. Social Security Number	PPN	Passport Number	CSI	Canadian Social Insurance Number	WPN	Work Permit Number	IND	INDEX Identification Number	OTH	Other	<ol style="list-style-type: none"> 10. Place an "X" in either Routine or PSE. Choose "Routine" if the data represent the results of monitoring for routine exposures. Choose "PSE" if the listed dose data represents the results of monitoring of planned special exposures received during the monitoring period. If more than one PSE was received in a single year, the licensee should sum them and report the total of all PSEs. 11. Enter the deep dose equivalent (DDE) to the whole body. 12. Enter the eye dose equivalent (LDE) recorded for the lens of the eye. 13. Enter the shallow dose equivalent recorded for the skin of the whole body (SDE,WB). 14. Enter the shallow dose equivalent recorded for the skin of the extremity receiving the maximum dose (SDE,ME). 15. Enter the committed effective dose equivalent (CEDE). 16. Enter the committed dose equivalent (CDE) recorded for the maximally exposed organ. 17. Enter the total effective dose equivalent (TEDE). The TEDE is the sum of items 11 and 15. 18. Enter the total organ dose equivalent (TODE) for the maximally exposed organ. The TODE is the sum of items 11 and 16. 19. Signature of the monitored individual. The signature of the monitored individual on this form indicates that the information contained on the form is complete and correct to the best of his or her knowledge. 20. Enter the date this form was signed by the monitored individual. 21. [OPTIONAL] Enter the name of the licensee, registrant or facility not licensed by the Agency, providing monitoring for exposure to radiation (such as a DOE facility) or the employer if the individual is not employed by the licensee or registrant and the employer chooses to maintain exposure records for its employees. 22. [OPTIONAL] Signature of the person designated to represent the licensee, registrant or employer entered in item 21. The licensee, registrant or employer who chooses to countersign the form should have on file documentation of all the information on the Agency Form Y being signed. 23. [OPTIONAL] Enter the date this form was signed by the designated representative.
<u>CODE</u>	<u>ID TYPE</u>														
SSN	U.S. Social Security Number														
PPN	Passport Number														
CSI	Canadian Social Insurance Number														
WPN	Work Permit Number														
IND	INDEX Identification Number														
OTH	Other														

Figure: 25 TAC §289.202(ggg)(9)

PAGE ____ OF ____

BRC Form 202-3				Texas Department of State Health Services/Radiation Control				
OCCUPATIONAL EXPOSURE RECORD FOR A MONITORING PERIOD								
1. NAME (LAST, FIRST, MIDDLE INITIAL)		2. IDENTIFICATION NUMBER		3. ID TYPE	4. SEX		5. DATE OF BIRTH	
					<input type="checkbox"/> MALE	<input type="checkbox"/> FEMALE		
6. MONITORING PERIOD		7. LICENSEE OR REGISTRANT NAME		8. LICENSE OR REGISTRATION NUMBER(S)		9A.	9B.	
						<input type="checkbox"/> RECORD	<input type="checkbox"/> ROUTINE	
						<input type="checkbox"/> ESTIMATE	<input type="checkbox"/> PSE	
INTAKES				DOSES (in rem)				
10A. RADIONUCLIDE	10B. CLASS	10C. MODE	10D. INTAKE IN μ Ci	DEEP DOSE EQUIVALENT (DDE)		11.		
				EYE DOSE EQUIVALENT TO THE LENS OF THE EYE (LDE)		12.		
				SHALLOW DOSE EQUIVALENT, WHOLE BODY (SDE,WB)		13.		
				SHALLOW DOSE EQUIVALENT, MAX EXTREMITY (SDE,ME)		14.		
				COMMITTED EFFECTIVE DOSE EQUIVALENT (CEDE)		15.		
				COMMITTED DOSE EQUIVALENT, MAXIMALLY EXPOSED ORGAN (CDE)		16.		
				TOTAL EFFECTIVE DOSE EQUIVALENT (BLOCKS 11+15) (TEDE)		17.		
				TOTAL ORGAN DOSE EQUIVALENT, MAX ORGAN (BLOCKS 11+16) (TODE)		18.		
				19. COMMENTS				
20. SIGNATURE -- LICENSEE OR REGISTRANT								21. DATE PREPARED

**INSTRUCTIONS AND ADDITIONAL INFORMATION PERTINENT TO THE
COMPLETION OF BRC FORM 202-3**
(All doses should be stated in rems)

1. Type or print the full name of the monitored individual in the order of last name (include "Jr," "Sr," "III," etc.), first name, middle initial (if applicable).
2. Enter the individual's identification number, including punctuation. This number should be the 9-digit social security number if at all possible. If the individual has no social security number, enter the number from another official identification such as a passport or work permit.
3. Enter the code for the type of identification used as shown below:

<u>CODE</u>	<u>ID TYPE</u>
SSN	U.S. Social Security Number
PPN	Passport Number
CSI	Canadian Social Insurance Number
WPN	Work Permit Number
IND	INDEX Identification Number
OTH	Other

4. Check the box that denotes the sex of the individual being monitored.
5. Enter the date of birth of the individual being monitored in the format MM/DD/YY.
6. Enter the monitoring period for which this report is filed. The format should be MM/DD/YY - MM/DD/YY.
7. Enter the name of the licensee or registrant.
8. Enter the Agency license or registration number or numbers.
- 9A. Place an "X" in Record or Estimate. Choose "Record" if the dose data listed represent a final determination of the dose received to the best of the licensee's or registrant's knowledge. Choose "Estimate" only if the listed dose data are preliminary and will be superseded by a final determination resulting in a subsequent report. An example of such an instance would be dose data based on self-reading dosimeter results and the licensee intends to assign the record dose on the basis of TLD results that are not yet available.
- 9B. Place an "X" in either Routine or PSE. Choose "Routine" if the data represent the results of monitoring for routine exposures. Choose "PSE" if the listed dose data represents the results of monitoring of planned special exposures received during the monitoring

- period. If more than one PSE was received in a single year, the licensee or registrant should sum them and report the total of all PSEs.
- 10A. Enter the symbol for each radionuclide that resulted in an internal exposure recorded for the individual, using the format "Xx-##x," for instance, Cs-137 or Tc-99m.
 - 10B. Enter the lung clearance class as listed in subsection (ggg)(2)(F) of this section for all intakes by inhalation.
 - 10C. Enter the mode of intake. For inhalation, enter "H." For absorption through the skin, enter "B." For oral ingestion, enter "G." For injection, enter "J."
 - 10D. Enter the intake of each radionuclide in ΦCi .
 11. Enter the deep dose equivalent (DDE) to the whole body.
 12. Enter the eye dose equivalent (LDE) recorded for the lens of the eye.
 13. Enter the shallow dose equivalent recorded for the skin of the whole body (SDE, WB).
 14. Enter the shallow dose equivalent recorded for the skin of the extremity receiving the maximum dose (SDE, ME).
 15. Enter the committed effective dose equivalent (CEDE) or "NR" for "Not Required" or "NC" for "Not Calculated".
 16. Enter the committed dose equivalent (CDE) recorded for the maximally exposed organ or "NR" for "Not Required" or "NC" for "Not Calculated".
 17. Enter the total effective dose equivalent (TEDE). The TEDE is the sum of items 11 and 15.
 18. Enter the total organ dose equivalent (TODE) for the maximally exposed organ. The TODE is the sum of items 11 and 16.

19. **COMMENTS.**
In the space provided, enter additional information that might be needed to determine compliance with limits. An example might be to enter the note that the SDE,ME was the result of exposure from a discrete hot particle. Another possibility would be to indicate that an overexposed report has been sent to the Agency in reference to the exposure report.
20. Signature of the person designated to represent the licensee or registrant.
21. Enter the date this form was prepared.